Southern Power & Industry

The Industrial and Power Journal of the S[illegible] Southwest

A W. R. C. Smith Publication

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SERVES plant managers, superintendents engineering department heads and plant operating staffs.

PROVIDES information to solve design, installation, operating and plant maintenance problems.

MAGNESIUM IN ALABAMA - - - - Page 22

The new $5 million plant of Alabama Metallurgical Corporation in Selma, Ala., produces magnesium at the rate of 6,000 tons per year from calcined dolomite, blended with ferrosilicon and a small amount of fluorspar. The briquetted material (above) is placed in furnaces and liberated by vacuum distillation.

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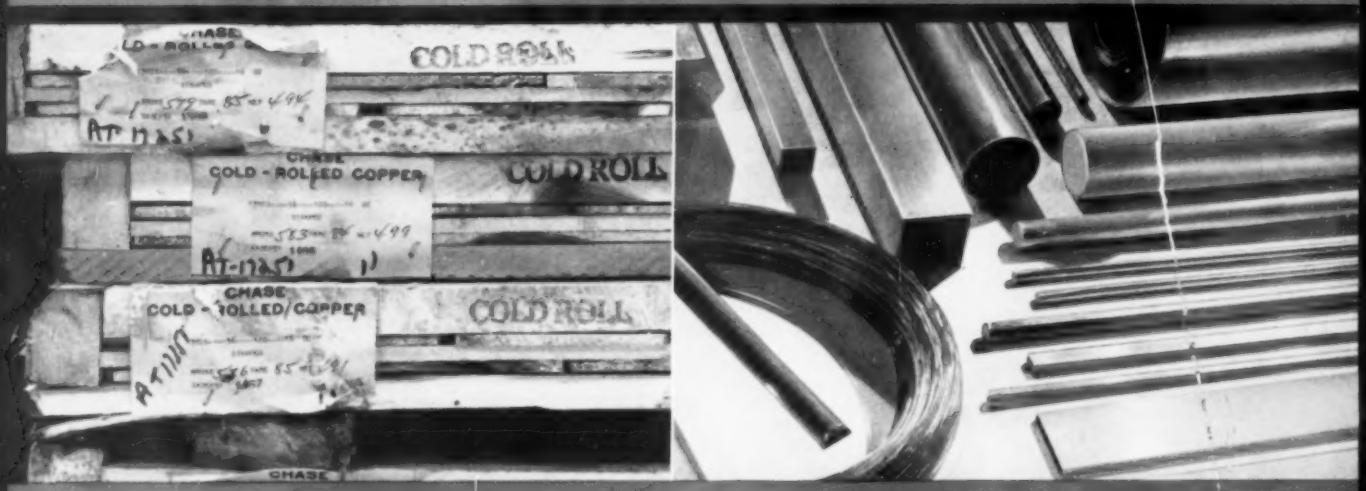

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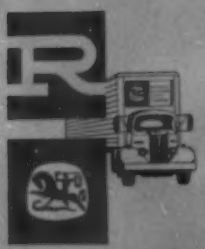

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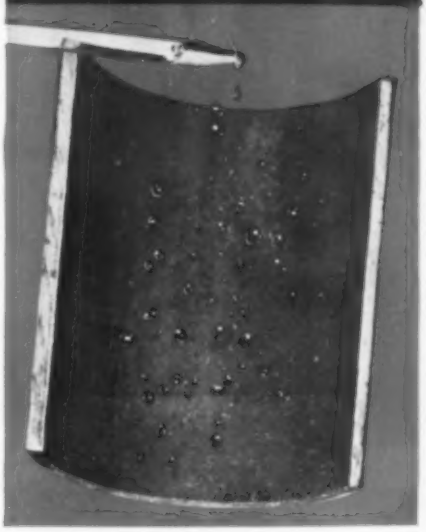

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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

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HEADQUARTERS

Facts and Trends

For more information on any of the following items—
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SEPTEMBER, 1961

◆ BERYLLIUM—Light, tough, heat-resistant beryllium is creating a flurry of excitement in the world of metallurgy, says the Alexander Hamilton Institute. The remainder of this year will be a period of technical preparation for big production in 1962.

Beryllium powder is being experimented with in the making of solid propellants for rockets and missiles. There is also a big future market for the metal, either by itself, or as an alloy with other metals, in dozens of electronic, atomic and appliance applications. The Lithium Corporation of America, through its subsidiary, the Beryllium Metals & Chemicals Corporation, hopes to be operating a commercial plant at Bessemer City, N. C., by mid-1962.

◆ DIRECT COOLING FOR MOTORS—Hollow conductor rotors are being used by English Electric to provide direct air cooling for high speed, large slipring motors. The new English Electric design effectively disposes of a cooling problem posed by the use of the variable speed drive which is often required today, with the higher pressures and larger sizes of centrifugal boiler feed pumps.

For this purpose the slipring motor has the advantages of low cost, simple control and low starting current. However, providing good cooling for the end windings, while retaining adequate mechanical support, can be a problem. English Electric's solution is to allow air to enter at both ends of the conductors, which are made from hollow rectangular section copper. This keeps the end windings cool and at the same time increases the efficiency of the motor by reducing to a minimum the quantity of cooling air required.

◆ COMBUSTION CATALYST—Field reports on the newest fuel oil additive "Pyrocat" indicate solution of serious combustion problems. The character and experience of engineers that made trial runs, lends weight to manufacturer's literature which is free of trick words, and miracle claims. Apparently the preliminary results are "laid on the line" for all to examine and discuss.

The material is already in service in a number of installations. Tests made by a large utility company indicate remarkable improvement in efficiency and elimination of "gook." Engineers of a leading boiler manufacturer and representatives of utility companies have examined performance during the tests, and seem impressed. Pyrocat is a solution of organic compounds of chromium, cobalt, aluminum and iron dissolved in a petroleum base solvent. The material is manufactured by MacKenzie Chemical Works and distributed by the Kissick Company, 1906 Packard Bldg., Philadelphia 2, Pa.

(Continued on Page 10)

This compact Package Air Preheater is being installed on a 150,000 lb/hr boiler at Olin Mathieson Chemical Corp.'s Brandenburg, Kentucky, petrochemical plant. When in operation it will recover enough heat from the boiler exhaust to increase efficiency of the boiler between 8% and 9%.

OLIN MATHIESON RECOVERS 360°F FROM BOILER EXHAUST WITH 11½′ x 11′ x 8′ PREASSEMBLED LJUNGSTROM® PACKAGE AIR PREHEATER

Olin Mathieson specified a Ljungstrom Package Air Preheater because it saves space as well as fuel. Mathieson's Ljungstrom occupies only about 1000 cubic feet, but cuts boiler exhaust temperature from 680°F to 320°F — puts 360° of heat back to work in the boiler.

The compact preassembled Package Air Preheater is ready to run when it's delivered—just connect to the power line and ducts, and it's on-stream. You make big savings on installation because there's no on-the-spot erection.

You can use a Ljungstrom Package Air Preheater on boilers from 25,000 to 250,000 pounds of steam per hour. For more information, write today for your free copy of a 14-page booklet.

THE AIR PREHEATER CORPORATION

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Functional Colors For Steam Plants

The trend toward the use of more color is accelerating. Proper color selection and careful planning result in modern and attractive plants without increase in either initial or maintenance costs.

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PASTEL BLUES AND GREENS are employed extensively for supporting steel and structures. Against a neutral metallic gray background, these decorator colors become more pronounced and effective.

SAFETY COLORS, the same as those of the familiar traffic lights, are employed as accents. Fire Engine Red is used for fire equipment and danger zones; Safety Yellow for caution areas, stair risers, hand rails; and Safety Green for first aid cabinets, stretcher locations, etc.

All "Subox" and "Subalox" Paints (Registered Trade Marks), have a unique base of lead-suboxide, *a chemically active, rust-inhibitive pigment.* They are truly protective and economical. A wide selection of colors is offered.

FOR NEW CONSTRUCTION, two coats of Subox paints usually will replace the customary three coat system; or three coats will replace four, depending upon color choice.

FOR MAINTENANCE PAINTING, a single coat of Subox paint usually is sufficient.

Send for color cards and technical data.

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For Your Ideas

SP&I presents each month helpful features, ideas, methods and procedures — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material — a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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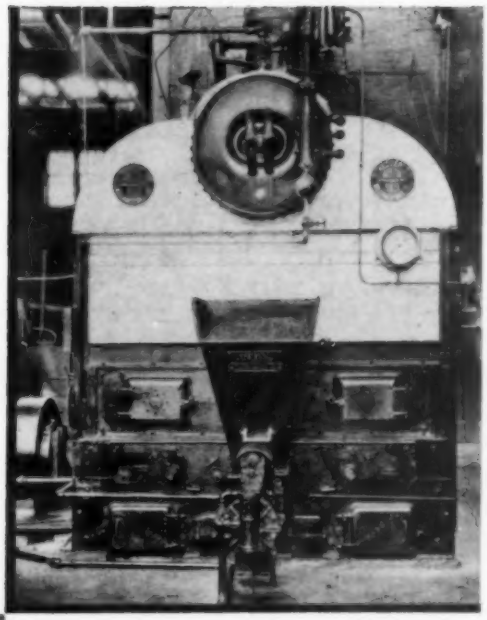

THE FIRST KEELER TYPE CP STEAM GENERATOR

Installed in 1936 at the Crystal Laundry in Frederick, Maryland

THE FIRST **KEELER** **CP**

...still delivering trouble-free service with minimum maintenance after 25 years of continuous operation

Here's what Crystal Laundry general manager A. C. Thomas has to say about the Keeler CP which serves his firm's requirements . . .

"This boiler has been so entirely satisfactory that if it was necessary to replace it, we would buy another Keeler. It has been very dependable."

This Keeler CP Steam Generator *first* introduced furnace water wall design—*the first* boiler to offer large power plant reliability and economy in low-cost, factory assembled form. The CP design provides greater steam capacity per cubic foot of space occupied, greater furnace volume with less head room and more BTU's per square foot from radiant heat.

Other owners of 25-year old Keeler CP's report *"complete satisfaction on all points"* . . . *"no replacement or major maintenance"* . . . *"no failures despite long periods of over-rating operation"* . . . *"both units in service at full pressure"* . . . *"good dependable performance, producing far in excess of rating"* . . . *"well pleased with low operating and maintenance costs"!*

This type of steam generator economy and reliability is available in capacities up to 150,000 lb stm/hr—for all methods of firing, all types of fuel (and readily convertible). *Write or phone for full information* . . . insist upon Keeler quality to be sure of true economy and unmatched performance!

recent CP installations

A three-unit oil fired installation at an eastern high school; one of two stoker fired units at a midwestern college; and a two-unit gas fired installation at a tobacco processing plant.

The Seal of Quality in Water Tube Steam Generators

WRITE FOR FREE BULLETINS
No. F-14: Type CP Boilers
No. M-2A: Type CPM Package Boilers
No. DK-2: Type DK Package Boilers
No. MK-1: Type MK Boilers
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Facts and Trends (Continued)

◆ WATER CHILLING UNIT—A Westinghouse packaged water chilling unit has been installed at the Palma Sola School in Bradenton, Florida, one of the first elementary schools in that state to be air conditioned. The installation of the 80-ton capacity chiller marks the beginning of a major move by Florida school boards to air condition elementary schools throughout the state.

Chilled water for cooling only will be supplied by the water chiller; a hot water boiler will furnish the necessary hot water for heating. The water chilling unit was recommended by Roy E. Parker of Gulf Refrigeration Inc. (Bradenton, Fla.) after a detailed analysis showed the unit's installation could be accomplished at little additional cost.

◆ IMPROVED SHOP PRACTICES—An easy-to-use lighting calculator designed for shipyard use, a portable electric oven for baking paint, and a mobile welding unit are described in a collection of machine shop practices recently adopted by the Navy's Bureau of Ships for use by its industrial facilities.

Compiled from suggestions made by Navy employees, the collection of 72 time and labor saving devices has been released in an illustrated 29 page booklet through the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce, Washington 25, D. C.—Price 50¢.

◆ ALUMINUM TRANSFORMER—A precedent-setting aluminum power transformer —bristling with advanced design and materials use concepts— has gone on line at Aluminum Company of America's Massena works.

The 20,000 kva unit was fabricated for Alcoa by General Electric Company. Constructed of aluminum—except for the magnetic core, interconnecting cables, and insulating parts—the three-phase, wye-to-delta transformer employs an all-welded aluminum tank, aluminum core clamps, and aluminum radiators. Its winding structure incorporates aluminum foil in the high side and aluminum wire in the low side.

◆ PORTABLE ATOMIC PLANT—A portable, self-regulating atomic power plant to generate electricity beneath the surface of the sea or in remote land areas of the world without requiring any operating personnel is being developed by General Dynamics Corporation.

The small "package" plant—capable of long-term, unattended operation at generating capacities up to 2,000 electrical kilowatts—will be equipped with homogeneous fuel and moderator elements of uranium-zirconium hydride, similar to those which insure the self-regulated safety of General Dynamics' TRIGA research reactors.

◆ SUPERVISORY SYSTEMS—The utility industry's first solid-state supervisory systems have been installed at Western Massachusetts Electric Company by General Electric's Medium Voltage Switchgear Department.

Installation of the two solid-state systems heralds completely automatic power transmission for the entire Pittsfield area. Remote operation of three substations will be accomplished with a solid-state master control unit located at one substation. Installation of the transistorized equipment offers substantially lower maintenance costs and improved reliability over conventional supervisory equipment.

(Continued on Page 12)

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The Anaconda Wire & Cable Plant at Watkinsville, Ga., only 60 miles from Atlanta, is right in the heart of the South's dynamic economic action areas—where it can serve you best.

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Facts and Trends (Continued)

◆ GRINDING STRESSES—The Grinding Wheel Institute announces the publication of an 81 page booklet "Grinding Stresses: Cause, Effect and Control." This comprises the collected papers which have been published as articles in the trade press, and is based on research sponsored by the Grinding Wheel Institute and the Abrasive Grain Association.

This compiled information proves good grinding is not detrimental to fatigue strength. This work especially shows the grinding process to be a much maligned whipping boy. Definite reason has been shown to believe that fatigue strength is not affected appreciably in most normal grinding. Under conditions which are not very far removed from normal practice today, grinding can actually improve the fatigue strength of a part. Copies of the booklet are available by writing, on company letterhead, to the Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

◆ EXPOSITION AND TALKS—The influence of television is bringing about a change in the traditional pattern of technical and scientific meetings. So says Nelson Hibshman, Executive Secretary of the American Institute of Electrical Engineers, who is busy with the planning of the AIEE Winter General Meeting to be held Jan. 29-Feb. 2, 1962 in New York.

"Television has turned us from a nation of listeners to a nation of viewers." To satisfy this growing demand for visual demonstration, the industry-wide Electrical Engineering Exposition sponsored by the AIEE is being planned as an integral part of the technical sessions. Electrical-electronics engineers will be able to go from the technical sessions right into the exhibit areas to see actual demonstrations of the principles, procedures and materials they heard discussed.

◆ COOL CONCRETE—Chipped ice and 900 miles of Alcoa aluminum tube combine to play an important part in the construction of giant Glen Canyon Dam on the Colorado River.

The tube, produced at Aluminum Company of America's Lafayette (Ind.) works, is being imbedded in the nearly five million cubic yards of concrete required to build the dam. Water circulating through the tubing removes heat from the concrete, permitting it to harden without cracking. Prior to placing, the concrete is cooled in the batching plant, by the addition of chipped ice and chilled water. When heat-removal no longer is necessary, the aluminum tubing will be filled with grout and left in the 710-foot-high bulwark.

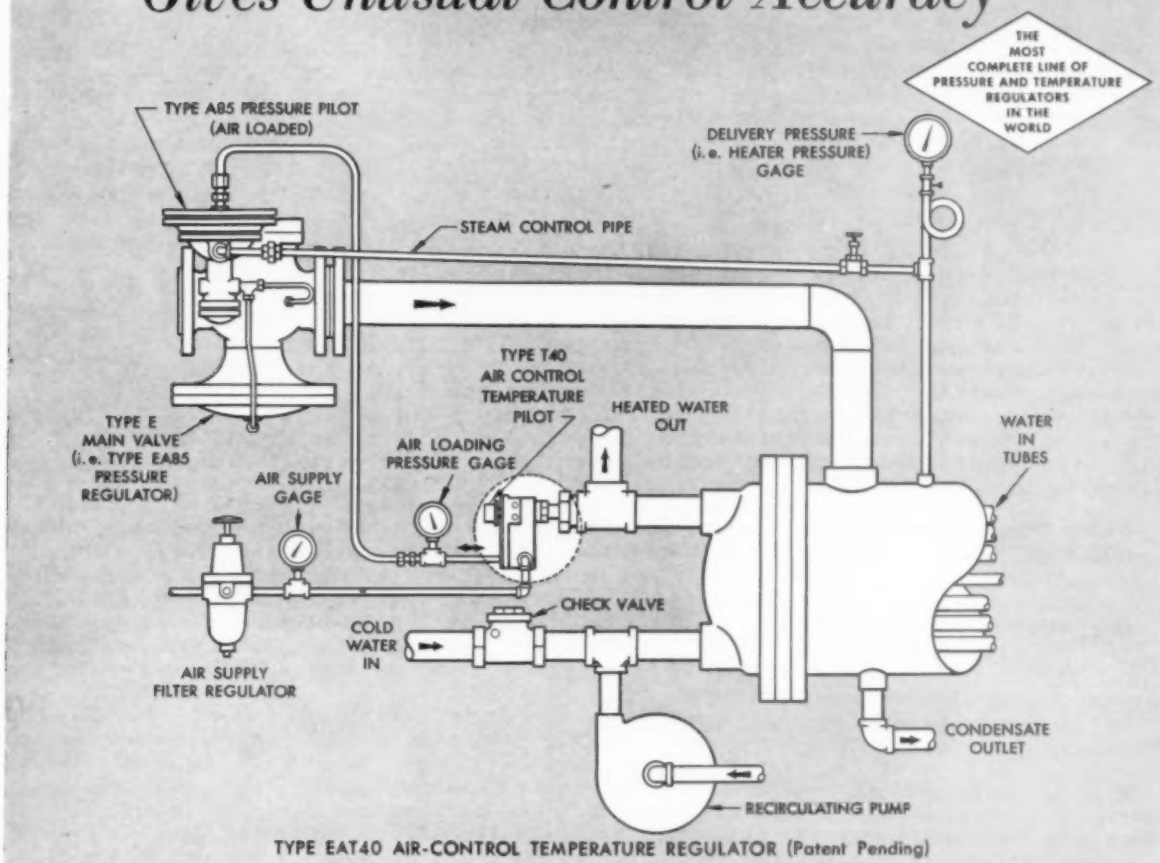
◆ ENGINEER IN INDUSTRY—Cooperative efforts by industrial management, individual engineers and professional engineering societies have resulted in significant professional progress within recent years, but these groups must continue to forge ahead in developing new ideas and techniques in the area of engineering employment practices.

This is the theme of a new book published by the Engineer-in-Industry Committee of the National Society of Professional Engineers. The comprehensive 148-page study, "The Engineer in Industry in the 1960's—A Professional Program," provides a complete analysis of the engineer in industry—his goals, his problems and what can be done to help his search for professional status and recognition. The book is available from the National Society, 2029 K Street, N.W., Washington 6, D. C. at $4.00 per copy for non-members and $2.00 for members.

(Continued on Page 14)

VALVE TIPS:

New Spence Temperature Control System Gives Unusual Control Accuracy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STEAM CONTROL PIPE
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CHECK VALVE
COLD WATER IN
AIR SUPPLY FILTER REGULATOR
CONDENSATE OUTLET
RECIRCULATING PUMP

TYPE EAT40 AIR-CONTROL TEMPERATURE REGULATOR (Patent Pending)

In a recent installation the new Spence air-control temperature regulating system provided:

- ±5°F control accuracy under wide and instantaneous load swings of 210 to 80 gallons per minute.
- Up to 50% reduction in cost as compared to instrument systems of similar accuracy.

This unique cascade-type control with throttling range adjustment independent of maximum heater pressure was developed to meet today's demand for greater control accuracy.

Additional features of the new Spence Temperature Control System include:

- 200°F wide adjustable temperature range
- Adjustable speed of steam pressure change
- Over and under temperature protection
- Pressure limit control
- Fast response
- Very low air consumption
- Field reversible for heating or cooling

The Spence Type EAT Air Control Temperature System, when properly installed, will tame wide ranging, fast changing loads of instantaneous heaters and modern heat exchangers. The cascade principle plus the use of an extremely fast responding bi-metal temperature sensing element reduce time lags and provide control stability.

Here's how the new Spence system operates:

Quick response is based on a bi-metal temperature sensing element. Temperature pilot continuously regulates a loading air pressure.

This loading signal, when applied to a pressure regulator to reflect heater temperatures, causes it to adjust the main valve as changes in load require.

Spence has also developed a new pressure control system based on this same cascade principle. This system has a control accuracy of ½ psi or better from positive pressures through the vacuum range to 30" Hg.

For complete information on these new air controlled temperature and pressure control systems, write for your copy of Bulletin 9.

SPENCE ENGINEERING COMPANY, INC.
Walden 1, New York

SE-140

Facts and Trends (Continued)

◆ BETTER SEEING—Research men at Uited States Steel use an ion emission microscope which can "see" a particle of steel containing only nine atoms. An electron probe microanalyzer can analyze a speck of steel 40 millionths of an inch across.

A telescope being built in Virginia—one of the world's largest —will use 20,000 tons of structural steel. The curved reflector of the dish-shaped instrument will be as wide as two football fields laid end to end and will permit study of stars 600 light years away.

◆ INDUSTRIAL HEALTH PROGRAMS—Most American companies consider the health of their employees an important asset, one which they are spending substantial time, money, and effort to protect. So says The Bureau of National Affairs, Inc. in a report on the results of a recent survey of industrial health programs in U. S. industry.

A survey of 171 companies participating in BNA's Personnel Policies Forum for 1961 disclosed that every one of the companies provides some kind of industrial health program for its employees. The programs pay for themselves, over 90 per cent of Panel members report. A few of them mentioned direct money savings in terms of reduced insurance premiums. The majority, however, say the programs pay off as a result of the overall benefits derived; for example, reduction in lost time from injuries and illnesses, reduced frequency and severity of accidents, lower absentee rates, prevention of diseases and injuries, and improved employee morale.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY, 1760 Peachtree Road, N. W., Atlanta 9, Ga.

. . . . . REPRINTS AVAILABLE . . . . . .

Write the editors of SPI for small quantities of the following at no charge.

- SEGCO 1,000,000 KW PLANT—A 16-page folder describing this large new Alabama plant, serving Alabama Power Co. and Georgia Power Co., is a combination of two technical articles from SPI's September and November 1960 issues.
- HOW EPOXY CAN SERVE YOU—4 pages. Tells exactly how 10 separate repair jobs were handled and describes several epoxy mixes that are good for maintenance jobs.
- PAINTS & PROTECTIVE COATINGS DIRECTORY:
  Tells where to get service and technical data.....12 pages
- ELECTRICAL DISTRIBUTION FOR LARGE PLANT—An 8-page special report prepared jointly by Director of Facilities, the Consultants, and the Contractor—describing plans and installation of all electrical services for new plant of Texas Instruments Inc., Dallas, Texas.
- THERMAL INSULATION DIRECTORY:
  Tells where to get service and technical data..... 6 pages
- WATER TREATMENT DIRECTORY:
  Tells where to get service and technical data.....12 pages
- AIR & GAS CLEANING DIRECTORY:
  Tells where to get service and technical data.....16 pages
- COMBINED GAS-STEAM CYCLE PERFORMANCE:
  First year report on new plant, West Texas Utilities Co.... 6 pages

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Armstrong Cork Expands at Macon

Armstrong Cork Company is completing its third major expansion in four years at Macon, Georgia, with the addition of a 60,000 sq ft exterior siding plant scheduled to be in production this fall.

Wood fiberboard building materials will be produced only by the Macon facilities. The company's Pensacola, Florida plant, which formerly shared in residential building materials, is now manufacturing incombustible acoustical products for commercial use exclusively.

Porter Opens Delta-Star Lynchburg Plant

A new plant, at Lynchburg, Va., for the production of distribution transformers, lightning arresters and industrial crane conductor systems has been put into operation by **Delta-Star Electric Division, H. K. Porter Company, Inc.** It will serve electric utilities and a wide range of industrial customers.

The 250,000 sq ft plant includes highly mechanized production equipment for distribution transformers; conveyorized production of lightning arresters, with automatic testing and recording of data for each arrester; improved and expanded facilities for industrial products, and an outdoor mechanical and electrical set-up for testing conductor systems under actual operating conditions.

A high voltage and high current surge laboratory capable of performing all standard tests, and a second laboratory, for simultaneous mechanical and electrical testing of insulators and for other tests, are also housed at the Lynchburg works.

Winding aluminum strip coils for Delta-Star's new distribution transformer at Lynchburg.

The new plant is especially adapted to the manufacture of Delta-Star's new DS-50 distribution transformer, which incorporates the use of aluminum strip winding in the low voltage coil. This unit will be produced in a wide range of sizes, and by 1962 will be available in capacities up to 500 kva.

Pittsburgh Plate Glass Expands at Lake Charles

The chemical division of **Pittsburgh Plate Glass Company** has started construction of a 15,000-ton per year sodium chlorate plant at Lake Charles, La. Preliminary site preparation is underway for the multi-million dollar unit which is scheduled for production by September 1962.

Salt converted into brine, basic raw material for chlorine and caustic soda produced at the Lake Charles plant, is also the basic raw material used in the electrolytic production of sodium chlorate.

A chlorate cell developed by the company will be utilized for production of high purity sodium chlorate.

Sodium chlorate is finding heavy tonnage use as a defoliant and in uranium ore processing. Chlorine dioxide, which is finding increasing markets in the pulp and paper industry to attain extra brightness on paper products, is produced from sodium chlorate.

Chemstrand Nylon Plant, Greenwood, S. C.

The Chemstrand Corporation's nylon yarn plant at Greenwood, South Carolina, shown in this aerial view, will be expanded by 200 per cent. The plant, which began operations less than a year ago, is located on a 1,400-acre tract on the shores of Lake Greenwood. Construction of the expanded facilities is scheduled for completion by May, 1962.

New Nitrogen Storage Facility — Virginia

A liquid nitrogen bulk storage facility, which will double present capacity for calibration and test of products for low temperature application, has been installed at **Cryogenics, Inc.**, Stafford, Va.

The added supply of liquid nitrogen will support increasing activity set up by the company last month. The 300-gallon chamber was supplied by Southern Oxygen Co.

The new laboratory provides comprehensive testing of components and systems used in industrial, military and research cryogenic applications.

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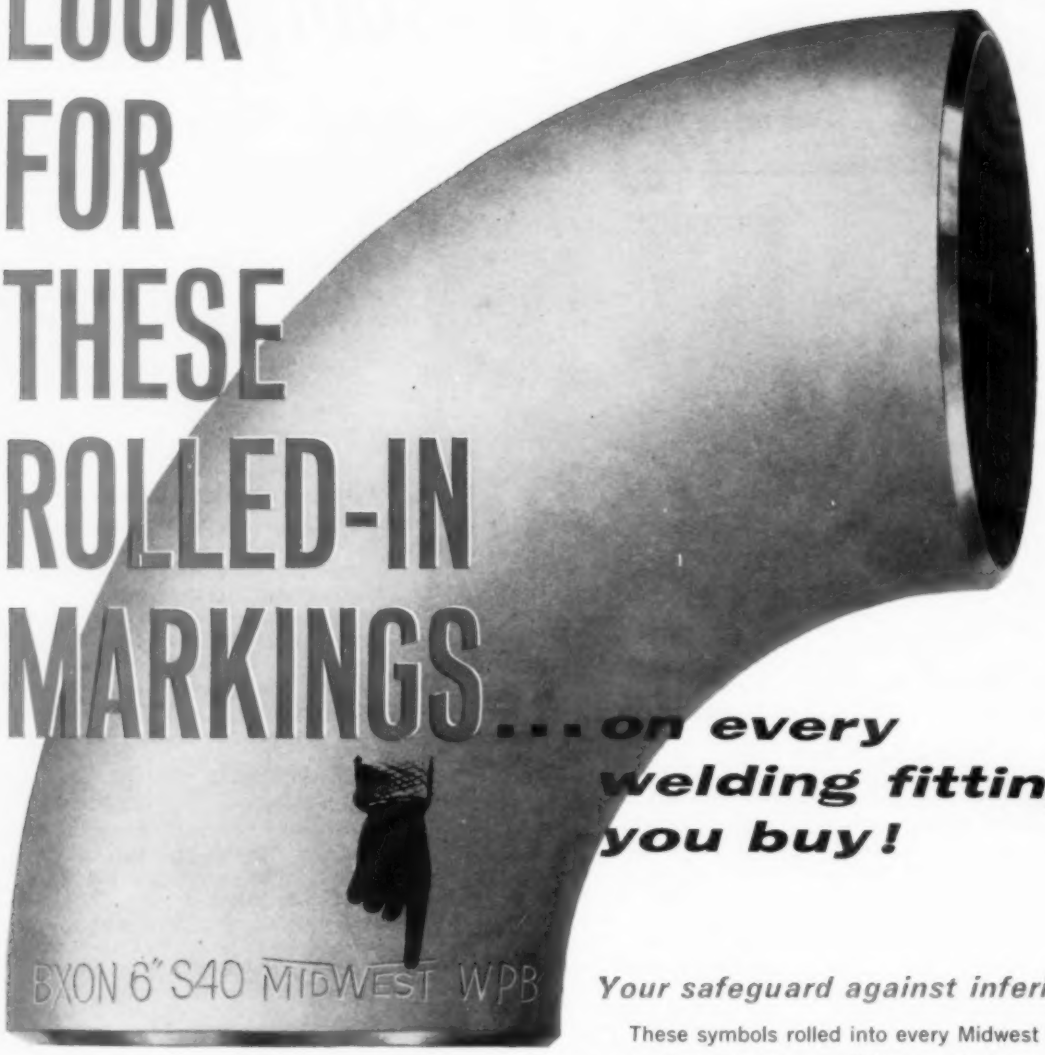

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FUTURE EVENTS of Engineering Interest

Sept. 11-15: 16th Annual ISA Instrument-Automation Conference & Exhibit, Biltmore Hotel & Memorial Sports Arena, Los Angeles, Calif. Sec'y, The Instrument Society of America, Penn Sheraton Hotel, 530 William Penn Place, Pittsburgh 19, Pa.

Sept. 12-14: 3rd Southeastern Plant Engineering & Maintenance Seminar, Town Hall & Coliseum, Greensboro, N. C. American Institute of Plant Engineers, P. O. Box 5111, Raleigh, N. C.

Sept. 24-27: ASME Petroleum Mechanical Engineering Conference, Muehlebach Hotel, Kansas City, Mo. Sec'y, ASME, 29 W. 39th St., New York 18, N. Y.

Sept. 25-28: Industrial Building Exposition & Congress, New York Coliseum. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Oct. 2-3: 29th Annual Meeting, Engineers' Council for Professional Development, Sheraton Seelbach Hotel, Louisville, Ky. Dr. R. C. Ernst, Local Chm., Dean, Speed Scientific School, University of Louisville.

Oct. 3-4: Coal Technology Conference, Dinkler-Tutwiler Hotel, Birmingham, Ala. Southern Research Institute, 2000 Ninth Ave. South, Birmingham.

Oct. 4-6 ASME Process Industries Conference, Shamrock Hilton Hotel, Houston, Texas. Sec'y, ASME, 29 W. 39th St., New York 18, N. Y.

Oct. 5-7: AIME-ASME Joint Solid Fuels Conference, Dinkler - Tutwiler Hotel, Birmingham, Ala. Sec'y, ASME, 29 W. 39th St., New York 18, N. Y.

Oct. 9-11: 17th Annual National Electronics Conference & Exhibition, International Amphitheatre and Hotel Sherman, Chicago, Ill. John S. Powers, Exhibits Chm., 228 N. LaSalle St., Chicago 1.

Oct. 19-20: ASQC 16th Midwest Conference, Chase-Park Plaza Hotel, St. Louis, Mo. Sec'y, American Society for Quality Control, 50 Church St., New York 7, N. Y.

Oct. 23-27: ASM Metals Show & Annual Fall Conference of Society for Nondestructive Testing, Cobo Hall, Detroit, Mich. Sec'y, American Society for Metals, Metals Park, Novelty, Ohio.

Oct. 24-27: 1961 Conference & Exhibition, South Central Region, NACE, Shamrock Hotel, Houston, Texas. T. J. Hull, Exec. Sec'y, NACE, 1061 M&M Bldg., Houston.

Nov. 27-Dec. 1: 28th Exposition of Chemical Industries, New York Coliseum. E. K. Stevens, International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Nov. 27-Dec. 1: Regional Conference, Southeast Region, NACE, Key Biscayne Hotel, Miami, Fla. T. J. Hull, Exec. Sec'y, NACE, Houston.

Jan. 29-Feb. 2, 1962: AIEE Winter General Meeting & Electrical Engineering Exposition, New York Coliseum. Reber-Friel Co., Mgr., 117 S. 17th St., Philadelphia 3, Pa.

(Continued on Page 50)

HOBBIES CORNER . . . . . .

"Thars Gold in Them Thar Hills"

NOT ALL of the hard work done by Atlantic Steel Company executives is at the plant.

Here's John Butler, Manager of Retail Sales of Steel Buildings on his "day off." He was on a Saturday safari with members of the Georgia Mineral Society.

He is digging for gold on the side of the road in the North Georgia mountains — and "believe it or not" he found it.

Land where the ancient river flowed is now near the top of a hill. Gold settled on the river bottom aeons ago, and the river bed was later filled by material eroded from the surrounding hills. Then the land surface changed so that the "river" is now on an elevation. Gold is found on the old rock bottom in the rubble where John is digging.

Incidentally, the editor's wife took a "sly dig" at John. He didn't know this action shot was being taken.

INDUSTRY SPEAKS

Cheap Power Propaganda Discussed

HARLLEE BRANCH, JR., president of The Southern Company, stated that government power propagandists appear to have exaggerated the significance of TVA's newly-announced *Norris Centennial* electric rate. He said the promulgation of the new rate serves again to point up the way in which the vast majority of American electric power consumers, supplied by investor-owned and taxpaying companies, are being discriminated against by their government.

Mr. Branch said it is ridiculous to claim that the new rate will serve as a *yardstick* for measuring the reasonableness of rates paid by consumers in other areas. When TVA and its distributors pay a fair price for the money furnished them by the Government, and when their tax obligations are equalized with those of the investor-owned utilities, then — and only then—will the "yardstick" principle have any validity.

MR. BRANCH'S FULL STATEMENT, made in response to inquiries by newspapermen, follows:

"The fact that the new rate was announced at a White House conference resulted in a fanfare of publicity completely unwarranted by the impact and importance of the rate itself. Apparently, it is another case of a relatively minor item being blown into an exaggerated propaganda piece for government power.

"The new rate appears to be merely another *optional rate* which municipalities and cooperatives, supplied by TVA, *will now be permitted to make available* to their customers if they elect to do so. The fact that the new rate is available does not mean that it will be used. Thus far, only two of TVA's 155 distributors — one municipality and one cooperative — have indicated that the new rate will be offered to their customers.

"It is interesting to note that, as of two weeks ago, according to an official TVA statement, only 34 of its 155 distributors had seen fit to give their customers the benefit of the lowest optional retail rate then available to them. Seventy-eight distributors, more than one-half of the total, were using the highest TVA-sanctioned retail rate. Any inference that the new Norris Centennial Rate will save TVA consumers $35 million a year is certainly far-fetched and misleading, since this figure assumes 100% acceptance of the new schedule by TVA distributors. Past history suggests that this will not occur.

"Despite the headlines, we do not understand that TVA proposes to reduce any of its own rates. All it is doing is giving its okay to possible rate reductions by its distributors. The distinction is quite important inasmuch as government power advocates have so often described TVA as a 'yardstick.'

"The 'yardstick' claim, of course, is ridiculous. Even TVA officials themselves have recognized that a power producer, which uses government funds, which is relieved from all income tax liability, and which enjoys other tax advantages, is not a valid measuring rod for judging the efficiency and economy of enterprises which have no such favored status.

"The public needs to be reminded again of the vast extent of the subsidies enjoyed by TVA and its distributors. At the end of fiscal year 1960, TVA and its distributors had in service electrical facilities valued in excess of $2 billion. This compared with a net plant of Southern's system companies (the Alabama, Georgia, Gulf and Mississippi power companies) of $1-1/3 billion at the end of 1960.

"Although our plant investment was only about 65% as large as that of TVA and its distributors, nevertheless our companies were compelled to provide out of their revenues nearly $66 million for taxes as against less than $17 million by TVA and its distributors.

"Moreover, in 1959, TVA was relieved of any obligation to repay to the U. S. Treasury approximately one-half billion dollars which it had accumulated from the use of its tax-financed facilities. At the same time, TVA was required to amortize only $1 billion of its appropriation investment of $1.2 billion, and this over a period of 54 years rather than 40 years as originally prescribed. TVA's distributors also enjoy substantial governmental subsidies in the form of either tax exemptions and/or lower-than-actual capital costs.

"When TVA and its distributors pay a fair price for the money furnished them by the Government, and when their tax obligations are equalized with those of the investor-owned utilities, then — and only then — will the 'yardstick' principle have any validity.

"The widespread publicity which accompanied the White House announcement of a new electric rate (necessarily based on government subsidies) is out of keeping with the President's earlier challenge that Americans 'ask not what your country can do for you — but what you can do for your country.' It is also out of keeping with the Administration's call for the closing of tax loopholes."

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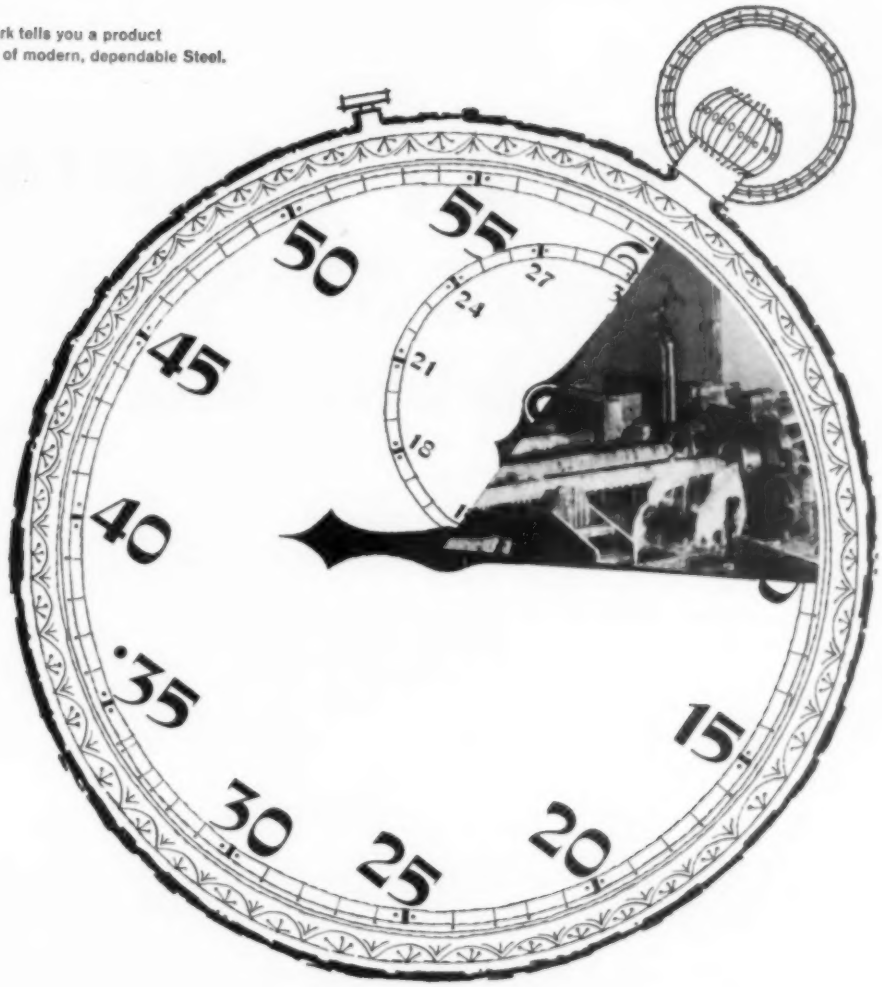

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Our rigid inspection of each pressure tube promises long efficient service in boilers, heat exchangers, condensers, super-heaters, economizers and other pressure applications.

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TIMELY COMMENTS

Quality Control Is Really Needed

"**THE INITIAL** operational success of advanced weapons systems, industrial apparatus, and consumer goods depends upon industry's ability to bridge the gap between the theory of research and the manufacture of quality products."

Dr. A. V. Feigenbaum, newly named president of the American Society for Quality Control and currently manager of General Electric's Manufacturing Operations and Quality Control, made this statement to executive members of the Society at its recent annual meeting.

Many of our equipment failures, he said, can be traced to the very real problem of having to translate, quickly and effectively, research and development findings into results on the production line.

Researchers, he explained, develop technically sound systems. The problem then is to develop production capabilities that will produce components of the quality required to make the system function. Part of the answer, he added, is to take into consideration at the design stage, the capabilities of the production equipment that will manufacture the final product.

There must, he added, be "total quality control" before we can produce high quality, reliable products on a continuing, uninterrupted basis. Even everyday products, such as connectors or nuts and bolts, that go into giant missiles must be of a predetermined quality or we risk failure of a multimillion-dollar product.

He pointed out that, in an effort to give the consumer a constantly increasing level of quality, American industry bears a heavy burden of costs incurred by factory rejects, scrap, and servicing because of failures. This, he said, is where the new profession of quality control engineering can be of great assistance to reduce these quality costs and, at the same time, increase the quality of the product.

Quality control engineering will also benefit industry and the customer, he explained, by conserving our natural resources through the reduction of rejects that must be scrapped. The savings in materials and man-hours can be tremendous, he added.

Mr. Feigenbaum said that he plans four major addresses this year on the subject of quality and its relation to American business and defense effort.

EDITOR'S NOTE:

Somebody ought to originate a new word to go along with: *quality control, mechanization, automation, sales appeal,* and *corporate image.*

I have in mind something like *functionalization.* The designer or creator should first realize that his new brain child will be bought to serve a purpose. The buyer is not interested in change merely for the sake of change. He wants his new purchase to be at least as good as his old model — possibly better. He wants it designed to do its job well, and put together so it won't quickly fall apart in actual use. And if it does need repairs, he wants to get those repairs done quickly and skillfully at a fair price.

Such things as excessive glare, uncomfortable seats, lighters that won't light and doors that won't lock can annoy the owner of new car even more than the loss of status that comes with too few tail lights and no power steering. He might even buy a foreign car to get one he thinks will be functional!

The same is true of industrial equipment. Certainly the buyer wants modern improved equipment. But he wants to be sure the "improvement" betters its performance for his application.

For instance there is little point in equipping plant lighting to come on automatically at dusk if the plant employs a full time watchman. Pushing a button twice a day won't break his back. But if the lights fail to turn on when he pushes — that's bad.

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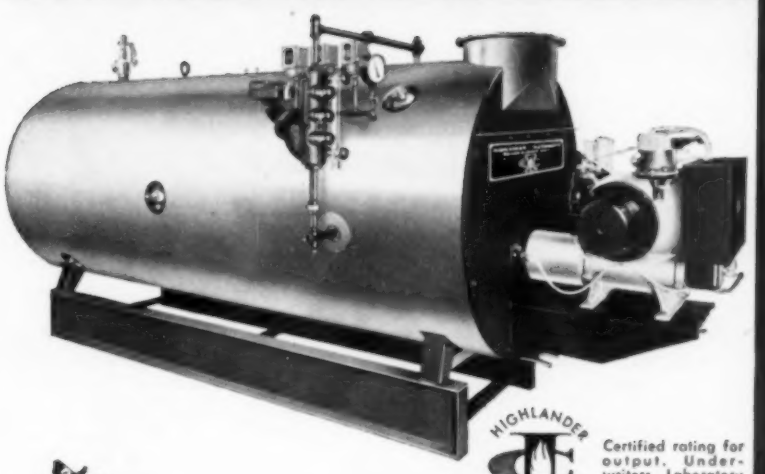

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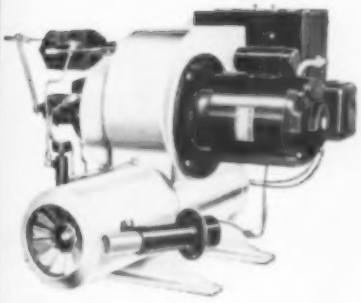

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No boiler can operate with high efficiency without a top-quality burner to fire it. That's why the nation's foremost engineers, contractors and architects choose the reliable HEV-E-DUTY Burner for use in important industrial, commercial and institutional buildings.

Built to get maximum economy from heavy oils or low-cost gas, HEV-E-DUTY BURNERS are completely assembled, wired, tested and fired at the factory. Installation is quick and easy. You get service-free, reliable performance day after day.

PERFECTLY MATCHED FOR MAXIMUM EFFICIENCY

Designed by experienced engineers . . . the Highlander is a completely automatic boiler-burner unit, simple to install and operate. Money-saving, easy maintenance. Each unit available with oil, gas or combination gas/oil burner, is factory-tested for reliability you can depend on. The entire unit is approved by Underwriters Laboratory with certified rating output to guarantee a superior performance!

The HEV-E-OIL Burner engineered to use inexpensive No. 4, 5 and 6 heavy oils is shown here. Available from 5 to 150 gph. HEV-E-DUTY Power Gas Burners and Combination gas/oil Burners from 720,000 to 21,000,000 BTU's.

Install HEV-E-DUTY BURNERS where ever quality and dependability are essential. Replace your existing burner, or better still — install one single unit — the Highlander Boiler-Burner Unit — the ultimate in efficient operation for power, processing or heating.

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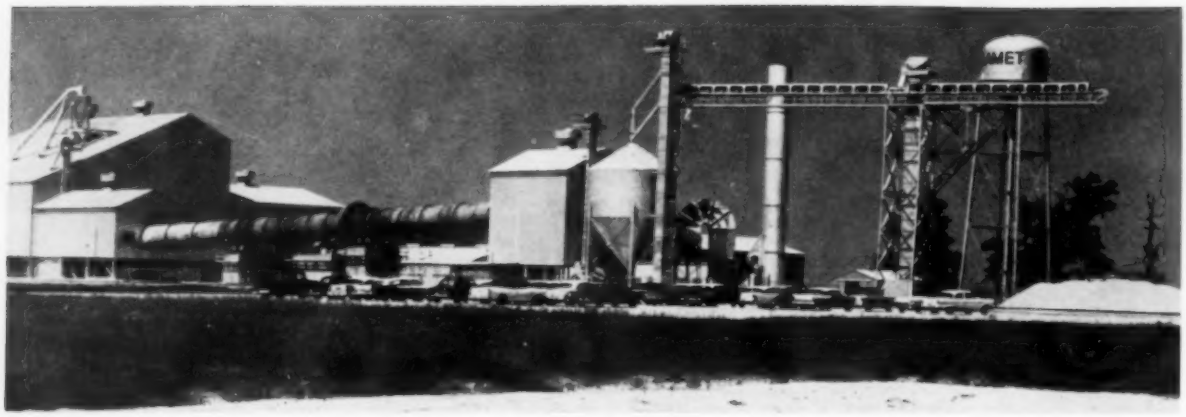


The new $5 million plant of Alabama Metallurgical Corporation in Selma, Ala., produces magnesium at the rate of 6,000 tons per year from calcined dolomite, blended with ferrosilicon and a small amount of fluorspar. The briquetted material is placed in furnaces and liberated by vacuum distillation.

How Magnesium Is Produced in Alabama

EVERY MISSILE that soars aloft from Cape Canaveral or Vandenburg Air Force Base is built partly of magnesium. So is every jet plane, military or commercial. The rising demand for this tough metal, one-third lighter than aluminum, has created a market sufficient to justify construction by Alabama Metallurgical Corp. (Alamet) of a wholly new $5 million, 6,000-ton-per-year plant in Selma, Ala., about 50 miles west of Montgomery.

This is the only magnesium plant in the United States which does not use the electrolytic process for the commercial production of magnesium. Instead the plant employs the Pidgeon thermal reduction process to extract magnesium from dolomite, a calcareous stone which is quarried at Montevallo, Ala., 50 miles north of Selma.

The Pidgeon process had been used during World War II and the Korean War, when demand for magnesium was particularly acute, but until the Alamet plant was built at Selma, this process had not been able to compete profitably with the electrolytic process in peacetime markets.

Alabama Metallurgical Corporation was formed expressly for the manufacture of magnesium. The company is owned 70 per cent by Calumet & Hecla and 30 per cent by Brooks & Perkins. The location in Alabama was chosen because of the large deposits of dolomite of the exact proportions of magnesium carbonate and calcium carbonate found to be most suitable for the process.

The 99.44 per cent purity for which Ivory soap is famous is no challenge at all to Alamet metallurgists. Commercial grade magnesium, 99.9 per cent pure, is attained with ease with Alamet's vacuum distillation production process, which produces crowns of virtually pure magnesium. High purity grade, 99.95 per cent pure, is likewise readily achieved, and even the remaining half of one per cent of possible impurities must meet exact specifications.

Quarry Operations

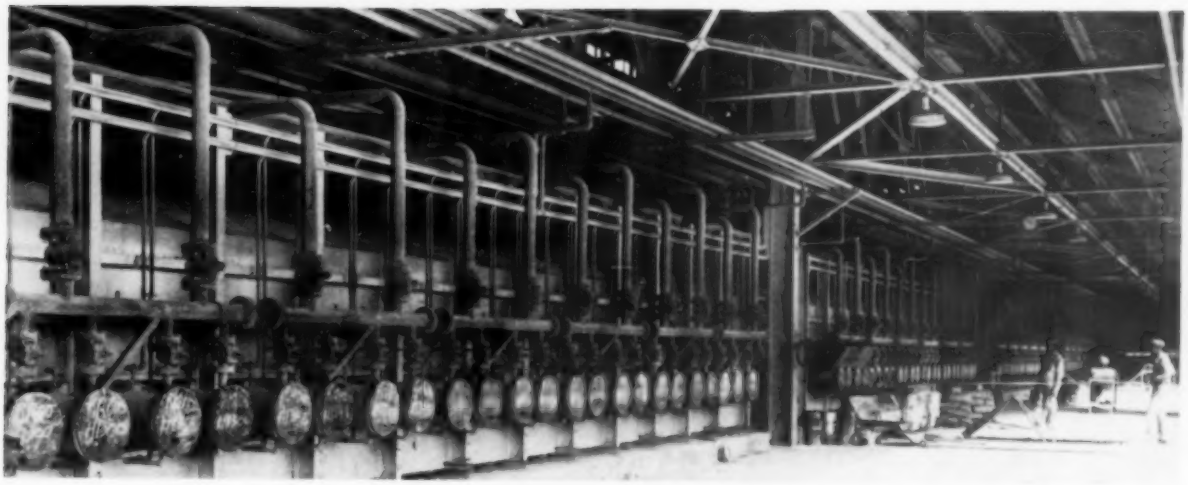
The dolomite is obtained from a newly developed quarry near Montevallo, Alabama, owned by Alamet and operated by Montevallo Limestone Company, which also operated its own quarry adjacent to the Alamet property.

The dolomite is trucked from the quarry, dumped into a hopper over the primary crusher and conveyed by an apron feeder and system of Link-Belt Pre-Bilt belt conveyors to a CA double-deck vibrating screen. Oversize is crushed in a secondary crusher, recirculated by belt conveyor to the screen, and the ½-in. by 1-in. sized product is delivered to loading bins over railroad tracks. The stone is then transported by hopper-bottom railroad cars to Selma.

Raw Material Preparation

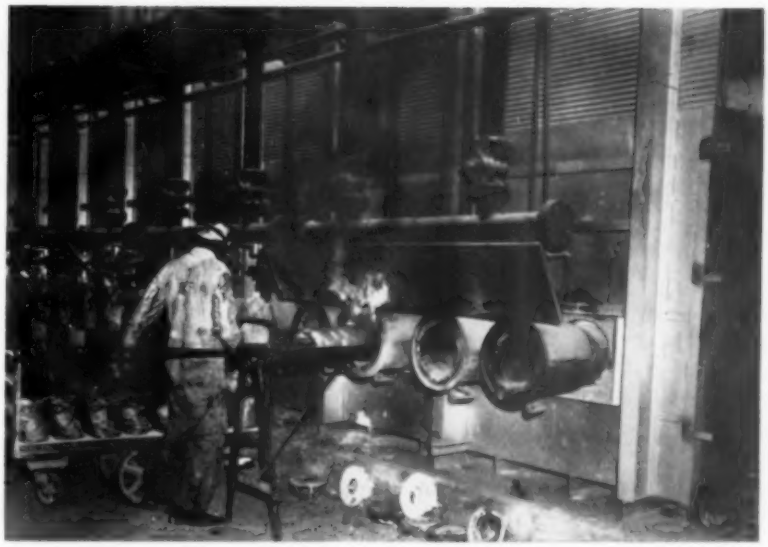
The plant at Selma consists basically of (1) a big materials handling system for processing the raw materials, (2) a line of ten giant furnaces, (3) preparing and melt rooms which turn out the finished product in ingots or pigs of extremely precise chemical analysis, (4) a laboratory where impurities in the finished product are measured within parts per million.

It takes five 50-ton carloads of dolomite to meet the daily needs of the Alamet plant. After the dolomite is calcined, 18 per cent is recovered in pure magnesium. Approximately a ton of ferrosilicon is blended with the calcined dolomite



Each of the ten gas-fired vacuum furnaces is fitted with 24 retorts, about 10 ft long. The ends project outside the furnace wall, surrounded by a water-cooled jacket. The magnesium vapor condenses and crystalizes on a removable sleeve placed in the cool end of the retort.

Once in an eight-hour period the vacuum in the furnace is broken, the retort opened, and the sleeve containing magnesium is withdrawn. After residue is removed, the retort is again charged with bags of briquettes. The removable sleeve is inserted in the retort, and the retort is again sealed.



for each ton of magnesium, and very small quantities of fluorspar are used as a catalyst to speed up the reaction.

The first step in the process of raw material preparation is similar to that of any limestone operation. The dolomite ore is emptied from hopper-bottom cars into a track hopper and reclaimed by belt feeder to a positive discharge bucket elevator. This elevator can discharge either directly into a storage bin ahead of the kiln or into an outdoor storage system.

Sized dolomite ore can be stored in an 8,400-ton outdoor stockpile by means of a reversible 20-in. wide belt conveyor which is about 75 ft above the ground and which receives the ore from the bucket elevator. This conveyor is 125-ft centers and discharges the ore over the head pulley onto the stockpile.

The ore is reclaimed as needed by a tunnel belt conveyor and elevated by a continuous bucket elevator to the reversible belt conveyor, which discharges to the storage bin ahead of the kiln.

Dolomite ore is withdrawn from the storage bin by a rotary table feeder and delivered by belt conveyor to an 8½-ft by 170-ft rotary kiln. The ore is calcined in the kiln to drive off the carbon dioxide, changing the calcium carbonate and magnesium carbonate in the dolomite to calcium oxide and magnesium oxide. This step is required in order to permit a reaction with the ferrosilicon.

The "calcine" is cooled, ground to 60 per cent 200-mesh by a roller mill and then stored in a 440 cu yd bin. From there it is conveyed to a three-compartment bin above a scale hopper.

Simultaneously the ferrosilicon is crushed, ground and delivered to the weigh bin. The raw ferrosilicon, 75 per cent grade, is deposited in a dump hopper by a front-end loader and delivered by a 30 ft centers apron feeder to a jaw crusher. The crushed material is carried by belt conveyor and bucket elevator to a surge bin and reclaimed to a ball mill which reduces it to 60 per cent 200-mesh. A continuous bucket elevator delivers it to a vibrating screen atop the three-compartment bin. The

properly sized material is discharged to the bin, while the oversize is recirculated to the ball mill.

Fluorspar, the catalytic agent in the process, is purchased preground to 300-mesh and stored in the third compartment of the bin.

Blending and Briquetting

The three materials, in the three compartments of the mixing bin, are fed in sequence into a scale hopper by means of screw feeders at the tapered bottoms of the three compartments. Each batch weighs about 3,200 lb. The material is discharged by an air-operated rotary valve into a surge hopper, and a screw conveyor conveys it to a blender. After blending to produce a homogenous mixture, the materials are pressed into briquettes about the size of one's finger.

The briquettes are conveyed by a 24-in. wide apron conveyor which carries them to a vibrating screen. Fines are returned by screw conveyor to the briquetting machines, while the briquettes are discharged into paper bags to facilitate feeding the reduction furnaces. The bags also eliminate any arch action in the retort during loading.

Magnesium Distillation

The magnesium is liberated from the briquettes in one of ten gas-fired furnaces, each about 60 ft long and fitted with 24 retorts. These retorts, consisting of tubes about 10½-in. in diameter and 10-ft long, are set horizontally in the furnaces, with the ends projecting outside the furnace wall and surrounded by a water-cooled jacket. A removable sleeve is placed in this cool end of the retort.

A vacuum in the retort allows the magnesium to distill at a much lower temperature than would otherwise be necessary. The magnesium oxide in the calcine is reduced by the silicon to produce magnesium vapor which condenses and crystalizes on the removable sleeve in the throat of the retort. This action is carried on for an eight-hour period at a peak temperature of about 2,150 degrees F, and about 85 per cent of the available magnesium is thus liberated.

The vacuum is then broken, the retort is opened, and the sleeve containing magnesium is withdrawn. The residue is then removed, and the cycle of charging and distilling is repeated.

In the distillation period the calcium oxide takes up the silica as a calcium silicate. Sodium and potassium, if present, are also liberated, distilled and condensed on a sodium condenser in the end of the retort.

The sleeves containing magnesium are placed in a sleeve press and the "crowns" ejected. The crowns are melted and cast into ingots or pigs. Any alloying which is required is done at this stage.

The metal is cast in a Link-Belt mold conveyor, the pans of which are designed to hold 50-lb pigs of the metal. The conveyor runs slowly and continuously. By the time each pan reaches the discharge end, the metal in it has solidified and can be readily lifted out and stacked in piles according to the batch.

A single-deck 4 by 8-ft vibrating screen removes the fines, and the briquettes are discharged into paper bags. The bags facilitate feeding the reduction furnaces and eliminate any arch action in the retort during loading.

Laboratory Control

Quality control is of utmost importance. Impurities must be held to a very few parts per million, and every batch is tested in the Alamet laboratory to determine not only the precise percentage of magnesium but also the chemical content of the 1/20 of 1 per cent that is not magnesium.

The vacuum distillation production process results in an extremely pure product, and Alamet's refinements in the process have resulted in producing a very high proportion of high-purity grade magnesium (99.95 per cent pure).

In view of the ever-increasing market for magnesium, Alamet has allowed room to expand the plant to five times its original size. The plant can double its present capacity merely by installing additional blending and briquetting machines and by doubling the number of furnaces, since the kiln, bins and conveyors have been built with necessary capacity for this expansion.

Simple Precautions in Working With Epoxies

NATIONAL SAFETY COUNCIL, CHICAGO

Dear Sirs:

Naturally, as editor of an industrial magazine, I do not want to overlook any bets in serving our readers — particularly in regard to safety. We have quite a number of new products being used in industry (including maintenance work) that are of the epoxy resin family. Of course, I know that the labels of practically all of these products carry a warning against careless use. But, I have not heard of any serious calamities such as indicated in the first paragraph of a recent release by a manufacturer of "decontaminants."

I am wondering if anything in the way of a strong warning to my readers is justified. And, if so, is a bit of accurate information on how to avoid trouble needed at this time?

If you have any printed pamphlets on this subject that you feel I should study, and mention in the magazine — I shall appreciate your sending them to me. Or, better still, if one of your men has time to write me an informative letter on this subject I shall greatly appreciate it.

Francis C. Smith, Editor

MR. FRANCIS C. SMITH, EDITOR SPI

Dear Mr. Smith:

In writing a general article on epoxy resins, one must be very careful not to create any unjustifiable alarm concerning any particular product. The concern with epoxy resins has been primarily with regard to skin irritation and sensitivity to curing agents, solvents, and to uncured or incompletely cured resins. There are no skin hazards from the use and handling of the cured epoxy resins. Some liquid epoxy resins have irritating and sensitizing properties considerably to a lesser degree than the amine hardeners. Also, some of the uncured resins in the solid state are even less irritating and practically non-sensitizing.

If you issue a strong warning covering all epoxy resin products, you would be subject to a flood of justified complaints from manufacturers of epoxy resin products.

The handling precautions differ depending on the type of curing agents, diluents, modifiers and solvents used. The amine curing agents are caustic and can cause severe burn and irritation of the skin. Some workers can become sensitized. Inhalation of the amine vapors may cause irritation of the eyes and throat. In addition, some amines may be absorbed through the skin to produce a systemic damage. The polyamide resins are practically non-irritating and non-sensitizing.

Organic acid anhydrides, in the form of dust or vapor, may be irritating to the eyes, nose and throat.

Very often, workers who are engaged in the application of epoxy resins are exposed to various solvents. These may contribute to skin eruptions.

Skin, eye and mucous membrane contact with the curing agents, uncured resins and diluents should be avoided. The eyes should be protected with chemical type goggles or face shield. The hands should be protected with rubber or plastic gloves and the body and arms with aprons and sleeves whenever the operations permit their use. Barrier creams can provide some protection against the epoxy resins and curing agents. Workers should be instructed to wash their hands with mild soaps frequently. Solvents for removal of the resin from the hands should definitely be discouraged.

It is recommended that disposable overlay papers be used on benches and floors where contamination is possible. Operations involving the weighing of resins and curing agents should be supplied with local exhaust ventilation.

Since some of the plasticizers and solvents used with epoxy resins have low flash points, there may be a fire and explosion hazard potential. Special attention should be given to this problem and also the storage problem. Fires should be extinguished with foam or carbon dioxide. Respiratory and eye protection should be used in fighting fires.

If epoxy resins are splashed into the eyes, the eyes should be flushed with water for at least 15 minutes. The worker should be immediately referred to a physician. If clothing or large areas of the body are contaminated, the body should be washed under a shower for at least ten minutes. The clothing should be washed before re-use.

The National Safety Council is preparing a data sheet on this subject. It probably will be published within the next six months.

We again emphasize that any very strong, general statement in your magazine concerning epoxy resin hazards may cause much undue alarm among your readers and bring justified criticism from the many reputable manufacturers of epoxy resin products. Since a variety of materials are used, the manufacturer of specific epoxy resin should be consulted on handling precautions.

If I can be of any further help to you, please let me know.

J. T. Siedlecki
Director of Industrial Hygiene
National Safety Council

Automatic digital logging and monitoring systems in the Thomas H. Allen generating station which serves 751 square miles in Memphis, Tennessee and the surrounding area.

Keeping Tab on Allen Station

By VICTOR C. SHATTUCK

Results Engineer, Thomas H. Allen Station, Memphis Light, Gas & Water Division

OPERATION of boilers, turbines, and associated equipment at the 862,500 kw Thomas H. Allen Generating Plant (Memphis) is performed with a high degree of reliability through the use of three Bailey 750 automatic digital logging and monitoring systems. The three information systems process a total of 558 individual electrical inputs and can easily be expanded to handle over 650.

Consolidation of log sheet printers and miscellaneous alarms on a seven-foot wide vertical panel section concentrate the readout in a centralized space that is considerably smaller than that required for conventionally controlled plants.

Boiler tube metal, turbine bearings, condensate and bleed steam temperatures, as well as pressure, conductivity, pH and other fluid purity measurements are a few of the readings monitored or logged by the automatic system. A portion of the total inputs are monitored in a continuous sequential scanning operation which progresses at a rate of one point per second. Automatic operation in the plant eliminates the need for visual checks as is required in standard operating plants and permits a smaller work force.

In addition to the automatic monitoring, the systems periodically log, in a consecutive and sequential manner, a predetermined number of variables from each of the three steam - electric generating units now in operation at the Memphis plant. Units 1, 2, and 3 are each served by a Bailey 750 system with provision for expanding to include the contemplated Unit 4.

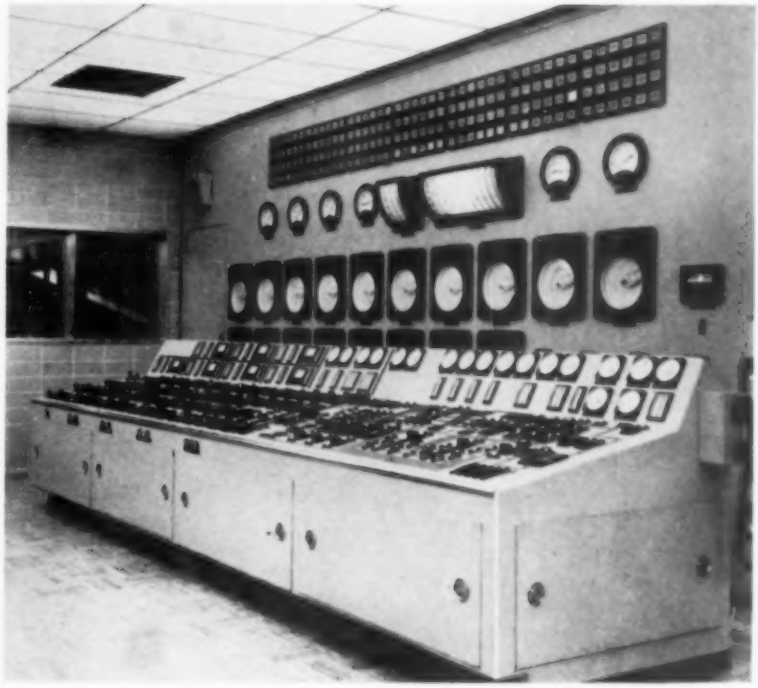
Written data is obtained on prepared log sheet forms which are automatically printed at half-hour intervals by separate Teletype page printers. Another centrally mount-

ed digital printer is actuated by alarms and records off-normal readings which may occur during the scan or log cycles.

The flexibility of monitoring operations has been extended by providing for manual demand logging of individually selected readings on the off-normal printer. In addition, manually preselected groups of associated points may be trended.

Readings of trend points are automatically obtained since each is monitored during the scanning cycle. They are recorded in digital form on the off-normal logger, or, in the case of tube metal temperatures, they may be trended in analog form. A multi-point recorder is employed for analog trending.

Functional design of the two systems permits operators to quickly detect trouble, isolate any problem and take corrective steps immediately. Both information systems have capabilities of seven modes of operation with each mode being independent from the other. Four modes of operation are incorporated during completely automatic operation and three modes during manual operation which may be made necessary in extreme cases. All modes perform specific functions allocated to them.



Automatic Control

During automatic operation the Bailey 750 systems (1) continuously scan process variables, (2) initiate periodic log cycles at predetermined intervals, (3) log off-normal points in either scan or underline during log cycles, and (4) trend predetermined variables which enter or leave off-normal conditions. The necessity for an operator to manually perform these operations is eliminated. In this way additional protection is provided which is superior to that obtained with ordinary instrumentation.

Manual Operation

Where necessity demands, the Bailey 750 system can be manually controlled any time except during the log cycle, which takes precedence over any type of operation. The three modes of operation possible during manual control include (1) analog trend of specific points in six groups of 20. These are recorded on standard strip chart recorders, (2) cyclic trend of specific variables during scan cycles, and (3) demand log for any point during scan cycle. With either manual or automatic control possible, complete control is assumed not only on an overall system basis, but on every individual measured variable.

Console controls provide for manually selecting and demanding any individual point. Also, the operator may switch in a bank of 20 points for analog trend on a strip chart recorder. It also provides an indication of unit number, point number and value.

A switching panel located in proximity with the console enables the operator to select any combination of 96 points for cyclic trend.

The compactness and functional design of the system with printers and alarms provides more usable plant information than do banks of instruments in conventional plants.

A review of all log sheets and periodic maintenance checks consume a total of three hours per week.

Since the installation of the Bailey Information Systems in June, 1959, the Memphis power plant has been in completely automatic operation and there have been no requirements for manual operation nor for plotting data on the strip chart recorders.

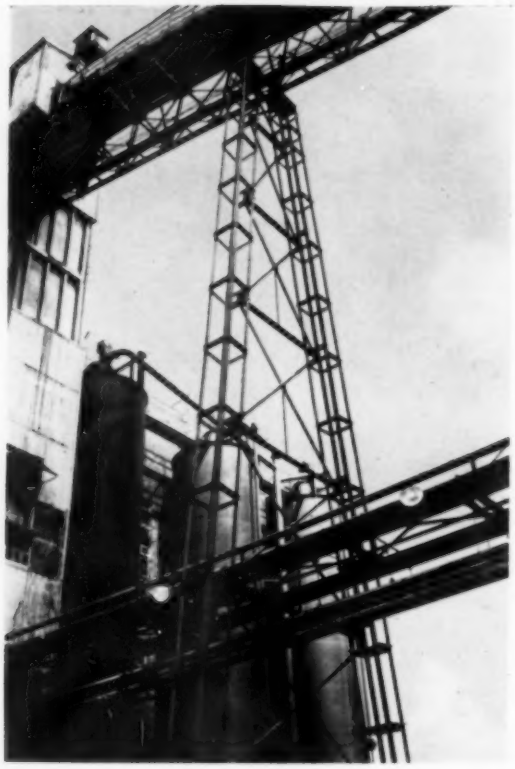
System Readout

Each Information System scans and measures selected input variables and compares them against predetermined high and/or low set points. Off-normal measurements are printed on the readout devices as they occur. All measurements are recorded once every one-half hour. Any individual point may be selected and recorded at any time except during periodic log cycle.

In the event of an off-normal condition for five predetermined groups of variables, annunciators are actuated on the readout console. These annunciators indicate turbine thrust bearing high temperatures, turbine bearing high oil temperatures, high drum or boiler metal temperatures, and air heater high temperatures, as well as ten different purity point limits.

Three typewriters are associated with each information system — two for periodic log (one for each steam-electric generating unit) and one for off-normal type readings. Thus a printed record of each op-

(Continued on Page 46)



Piping, tanks and structural steel, mastic coated for protection.

Mastics for Maintenance

By **FRANK M. KENNEDY, JR.**
President, Emjay Maintenance Engineers

MAINTENANCE men are familiar with the term mastics, but most are confused by the complexity of trade name terminology.

What are Mastics?

The term mastics is applied to several coatings formulated from coal tars or asphalts. Since the asphalt mastics enjoy the widest industrial application, we will concern ourselves only with asphalt base materials.

An asphalt mastic is a bituminous hydrocarbon which has a viscosity of 200,000 to 350,000 cps at 77 F. When utilized as a coating, it is reinforced with minerals and asbestos and applied with approximately 70 pounds air pressure.

Characteristics

An asphalt base mastic provides good chemical resistance to most nonoxidizing acids, alkalis and salts. It is also waterproof and possesses a very low moisture absorption rate. Other characteristics include good flexibility through a wide temperature range from —30 F to 250 F. It remains flexible at the low temperatures, and it will not sag at the higher temperatures. In addition, it will retain its adhesion under conditions of stress throughout the temperature range, and while undergoing vibration and shock.

Another characteristic of mastic coating is the applied thickness. Mastic coatings are normally applied to give a finish coat approximately 120 mils thick as compared to plastic coatings which are usually in the area of 15 mils and paint coatings which are under 5 mils.

Importance of Additives

The usefulness of asphalt mastics can be greatly increased by combining them with a variety of materials. For example, the addition of mica increases vapor sealing and moistureproofing qualities; the addition of granulated cork, asbestos fibers and certain ceramic clays improve insulating qualities. The use of slate granules imbedded into the wet undercoat improves the appearance and adds color.

The addition of gilsonite offers additional fire resistance and water resistance and contributes greatly to improving the useful temperature range and other characteristics of mastics. Gilsonite is so universally added to mastic coatings today, that when we speak of industrial mastics we automatically assume that gilsonite has been added and think in terms of the characteristics to be obtained from gilsonite mastics.

Gilsonite is a naturally occurring, hard brittle mineral that is mined in Utah. It is frequently called mineral rubber. It consists of saturated hydrocarbons which are not subject to chemical change by exposure to the elements or to chemicals. In addition, gilsonite has outstanding fire resistance and water resistance. Thus, as well as providing its own invaluable properties, the use of gilsonite adds to the strength and temperature resistance of the mastics, permits the use of higher operating temperatures and reduces shrinkage in a cured film.

Four Basic Types

Maintenance men should carefully outline the requirements of the coating to the supplier before ordering. This will insure selection of the most economical type for the application. Table 1 provides a good guide to the type most suitable.

Since the primary yardstick is the purpose or use, we have placed this category first in the table and have followed it with a general list of suitable applications. The third column gives detailed specifications. With this data you can compare competitive quotes where proprietary or trade name materials are offered. The examples listed after the detailed specifica-

tions are Emjay proprietary products.

Importance of Application

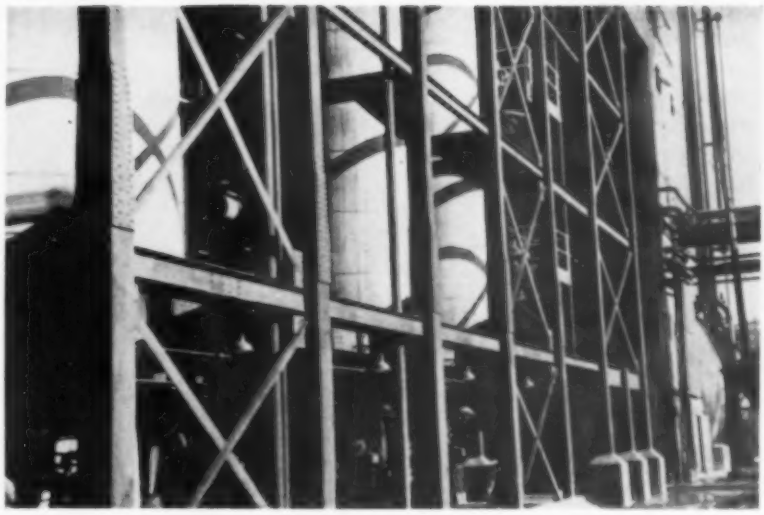
The maintenance man must remember that protective coatings are only as good as the application. Careful preconditioning of the surfaces must be done so that the hardening of coating materials is positive and secure.

Basically, the surfaces should be thoroughly cleaned and sandblasted to remove every trace of loosely adhered material. Brick surfaces may be chipped or pointed before applying a corrosion resistant primer. Metal surfaces should be sandblasted.

For sandblasting, we recommend using a clean, dry, hard and uniformly sized sand. The use of clay contaminated sands must be avoided as they will lead to early failure.

Zinc chromate prosphate primers are recommended immediately after sandblasting of metal surfaces. This goes a long way toward eliminating underfilm corrosion and towards securing a better bond of the asphalt coating.

The thickness of the mastic coating is in direct ratio to the problems to be encountered. Under normal atmospheric conditions, mastics applied at the rate of 6 gallons per 100 square feet are generally satisfactory. In areas where corrosion rates are high, application rates are approximately 10 gallons per 100 square feet. This results in a thickness of approximately 125 mils.



Mastic coated structural steel framework.

Multiple coating with mastics is seldom required since spray gun application can yield deposits of 150 mils in thickness with a single pass.

One of the major advantages of the properly applied mastic coating is the low cost of maintenance. Most reliable professional applicators will stand by the jobs.

ASPHALT MASTIC COATINGS WITH GILSONITE

PURPOSE	APPLICATIONS	SPECIFICATIONS
Corrosion proofing, vaporsealing.	Structural iron and steel towers, chutes, pipings, tanks and vats.	Gilsonite, asphalt and neoprene pure petroleum solvents. Coverage: 10 gallons for 10 square feet, ⅛" thick. (Example — Palladium Mastic "T")
Insulating, corrosion and weatherproofing.	Acid, storage tanks, piping, heating equipment, air conditioning units, hot water tanks, vats, ducts, and roofs.	Gilsonite, asphalt, granulated cork, asbestos, ceramic, clays, mineral fillers and pure balanced petroleum solvents. Efficient from —20 to 350 F. Coverage: 25 gallons for 100 square feet, ¼" thick. (Example — Palladium Mastic "3-X")
Weatherproofing, corrosion proofing, waterproofing.	Concrete, brick, stucco cement, hollow tile or cinderblock sidewalls.	Gilsonite, asphalt and plastic forming materials. Balanced petroleum solvents. Coverage: 5 gallons for 100 square feet, 1/6" thick. For color and texture, pigmented granules are imbedded in the wet overcoat. (Example — Palladium Mastic "AG")
Waterproofing, weatherproofing of insulation.	Insulated tanks.	Gilsonite, asphalt plus special membrane. After initial 1/16" is deposited on the surface a glass membrane is imbedded in the wet coat. Another 1/16" thick coat is deposited with high pressure spray apparatus over the membrane. (Example — Palladium Mastic "T-1" and "T-2")

NOTE—The example at end of each specification in right hand column is an Emjay proprietary product.

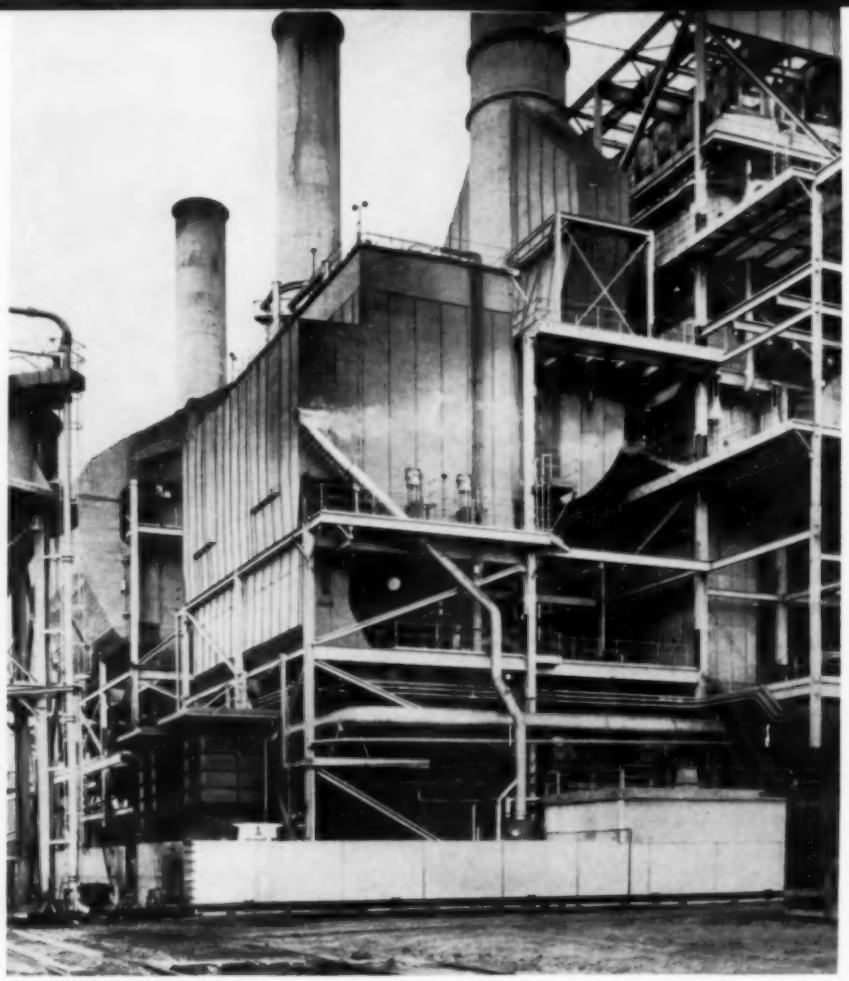


Fig. 1 — One of three fly-ash precipitators installed at Tampa Electric Company's Gannon Station in Tampa, Florida. The three precipitators remove fly-ash from 1,214,000 cubic feet per minute of stack gases from cyclone boilers.

By R. W. SICKLES
Operating and Service Department
Research-Cottrell, Inc.

Time Saving Maintenance Procedures for Fly-Ash Precipitators

SOME INTERNAL INSPECTION of fly-ash precipitators installed in steam generating plants is unavoidable. A program that requires a minimum of inspection time and produces maximum results in preventive maintenance is possible.

But, too often internal inspections are neglected because there is a scarcity of maintenance personnel and of shutdown time. Or the inspector does not know exactly what to look for, or where to look. Then, either the hot and dusty precipitator gets a time-consuming complete inspection, or it gets none at all.

A partial inspection of key points will shorten inspection time considerably and yet yield maximum dividends in preventive maintenance. Certain electrical indicators can also be used to pinpoint faults before an inspection is actually made. It should be noted, however, that the partial inspection may indicate that a complete inspection is necessary.

Control Board Indications

Using the normal electrical operation of a precipitator to help spot and analyze faults before inspection is a time-saving technique.

Here are nine simple electrical indicators of common faults. A voltmeter, ammeter and milliammeter (shown schematically in Fig. 2 of a typical electrical circuit for a precipitator) are all that is needed. Usually they will be found at the control switchboard.

Now, let us assume that electrical conditions at normal full load for our system are:

V = 300 A = 50 MA = 200

Exact values for a specific electrical precipitator can be obtained from the manufacturer.

1. If system drops to one-half load, both gas volume and dust concentration will probably drop; then R (resistance, see Fig. 3) will decrease, giving:

V = 260 A = 55 MA = 230

2. If system load stays constant but dust load increases, then R will increase, giving:

V = 350 A = 40 MA = 175

3. If gas temperature increases, then R increases. Sparking will also tend to increase because of higher dust resistivity.

V=300-350 A=50-60 MA=200-250

4. If gas temperature decreases, then R decreases to give:

V = 280 A = 52 MA = 210

5. If hopper fills with dust, R becomes low and:

V = 180 A = 75 MA = 300

Under these conditions, the rec-

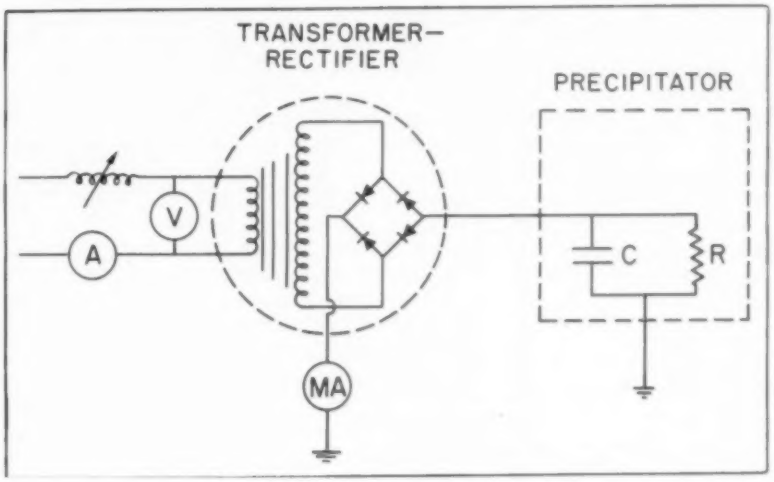


Fig. 2 — Ammeter (A), voltmeter (V) and milliammeter (MA), indicated in schematic of typical electric circuit for a fly-ash precipitator, help spot nine common faults.

tifier set will probably trip off. This will depend upon the setting of the protective overload relays.

6. If a discharge electrode breaks, R may become zero or it may vary between zero and normal if the top piece is left swinging inside the precipitator. This normally produces violent fluctuations of the switchboard meters. Often, the arcing can be heard outside the precipitator.

7. If a transformer-rectifier unit shorts:

V = 0 A = 100+ MA = 0

This indicates that no current is passing from the rectifier to the precipitator.

8. If a high tension rapper fails, then discharge electrodes build up with dust, and R becomes greater since corona discharge is decreased and it requires a larger V to keep current constant:

V = 330 A = 50 MA = 200

9. If a plate rapper fails, sparking tends to increase. It is then necessary to reduce V to keep A and MA constant.

V = 265 A = 50 MA = 200

By using these electrial indicators to check for possible faults while in operation, and inspecting a few key points in a fly-ash precipitator, you can obtain optimum preventive maintenance for the least expenditure of time and labor. To be effective, however, this program should be followed consistently and regularly. A complete inspection may be dictated by the information obtained through this economical program.

Key-Point Inspection

Here is a concise account of the key points in a precipitator to inspect. No attempt is made here to give details of the actual repairs. Repair procedures will depend on the time, money and material available in the individual case.

The condition of the following key points in a fly-ash precipitator gives a generally reliable indication of the condition of the entire collector. The location of these key inspection points is shown in Fig. 3. The numbers associated with these key points in Fig. 3 are also the numbers of the following brief paragraphs in which the actual conditions to look for are given:

1. Dust Build-Up in Hoppers

Any dust build-up which occurs in the hoppers will probably be

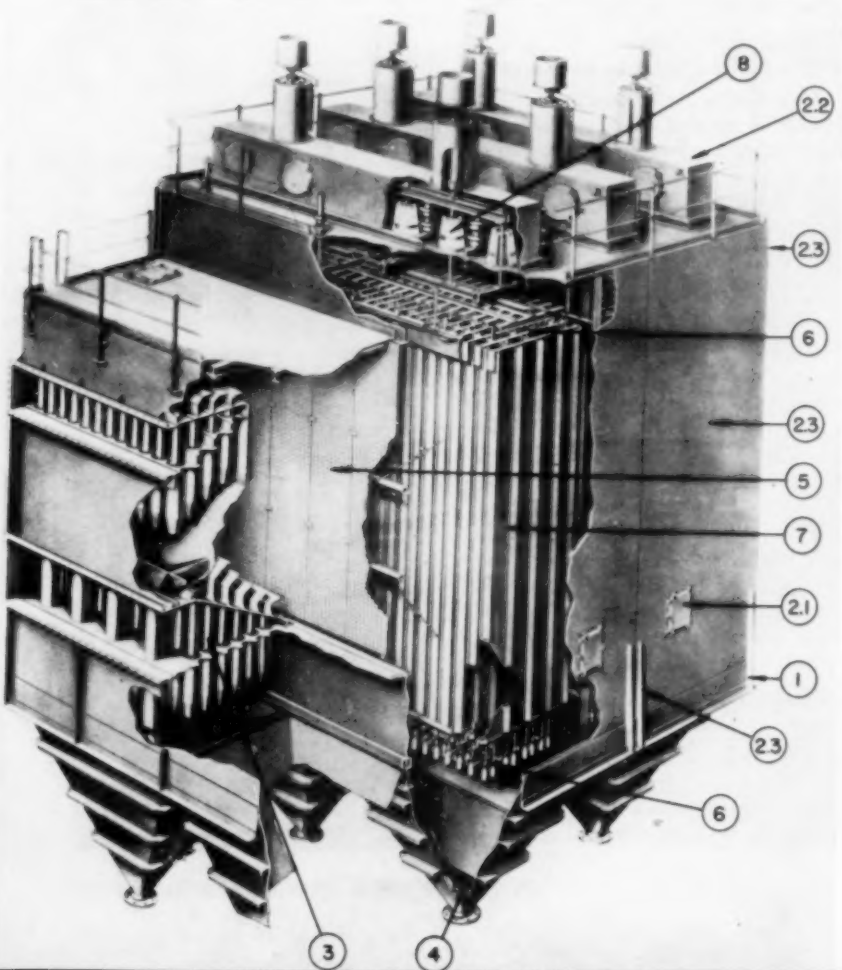


Fig. 3 — Key points in electrical precipitator (indicated by numbers) are basic minimum for inspection procedure. The numbers refer to numbered paragraphs in text.

most serious in the upper outside corners. This is also true of any hopper which became plugged during the previous period of operation but has subsequently been emptied. Always inspect the upper corners of these hoppers. A powerful spotlight eliminates the need to actually enter the hopper. *Caution:* Always open hopper doors slowly or you may be in the path of an avalanche of hot dust.

2. Corrosion

Corrosion, when it exists at all, often occurs, unfortunately, in the most inaccessible parts of a precipitator. Check the following spots where the first signs of corrosion most frequently occur.

2.1 Doors and Door Frames

It is usually difficult to insulate or gunite around door frames. Consequently, there may be some corrosion here, but it is comparatively easy to check.

2.2 Insulator Compartments

The temperature in insulator compartments is usually lower than the gas temperature. Therefore, condensation and corrosion can occur here unless the compartments are properly vented.

2.3 Main Shell

Inside the main shell of the precipitator check the following spots:

(a) Look for corrosion on the undersides of roof plates along an outside wall.

(b) Look for corrosion, and dust impaction as well, between end collecting plates and an outside wall.

(c) Look for localized corrosion in back of external uninsulated stiffening members which act as heat fins.

The prevention of corrosion is accomplished by keeping the interior surfaces of all ducts and collectors hot at all times. Proper external heat insulation will accomplish this.

Special procedures are sometimes required for installations which operate on reduced load during part of the day. It may be desirable to by-pass a portion of the gas around a preheater in order to raise the gas temperature at low load.

3. Mechanical Collector Tubes

Mechanical collectors are often combined with electrical precipitators for fly-ash installations. The plugging of mechanical tubes can occur at the bottom, inlet spinner, or outlet tube. Tubes along a cool outside wall, or on the cooler side of an air heater gas discharge, are most likely candidates for plugging. Spot checking should be concentrated on these areas.

Check the bottoms of the tubes from the hopper doors by using a powerful spotlight. Additional checking can also be done by inserting a powerful light in the hopper, then looking for light reflections in the top header and through the inlet spinners.

4. Hoppers

Look on the hopper grating or in the hopper throat for objects such as broken wires, pieces of gunite, scale, etc. These items will indicate the need for further inspection.

5. Perforated Distribution Plates

Plugging of these plates is not usually a problem on straight coal operation. During oil firing over a long period, however, perforated plates have sometimes plugged. They can be inspected with a powerful spotlight through the flue doors.

6. Discharge Electrode Breakage

If a discharge electrode breaks, it can be located from the hopper door with a powerful light, since the weight and part of the wire will drop into the hopper. Look for missing weights. The upper portion of a broken wire is then removed from the top.

7. Warpage of Internal Elements

There have been some cases where collecting plates have become warped because of excessive heat. Here it will probably be necessary to inspect completely, although the worst sections can be located quickly by energizing the precipitator and noting which bus sections show shorting or sparking. For safety reasons, a responsible supervisor must be present whenever a precipitator has to be energized during inspection.

8. High Tension Bushings

These bushings, which separate hot, moist gases from relatively cool insulator - compartment air, sometimes become coated with acid and dust on the inside. They then become conductive and crack under high voltage stresses. These can be inspected and cleaned from the top without entering the treatment zone.

9. Condition of Dust Deposits

The condition or thickness of dust deposits on interior parts is an indication of gas velocity. The gas velocity should normally not be over ten feet per second in the precipitator. Highly polished surfaces indicate high velocities. This is always detrimental when found inside a precipitator.

10. Final Check

Finally, as a check on the inspection or work done, always allow time to close the precipitator properly and energize it with the normal power supply at the maximum possible input. The voltage on the transformer primary will usually be slightly lower than during gas load operation. This check will, however, be an indication as to whether or not a short still exists.

Improvised "Stethoscope"

AN ELECTRIC "stethoscope" is made of two flashlight batteries connected in series and an old sending unit and receiving unit from a telephone. This device is used to locate broken valves in compressors (see illustration) and for other similar applications. This device saves considerable time in locating hidden mechanical troubles.

YARWAY news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*
ATLANTA OFFICE: 453 IVEY BUILDING, 3330 PEACHTREE ROAD, ATLANTA 3, GEORGIA

SOLID SUCCESS!

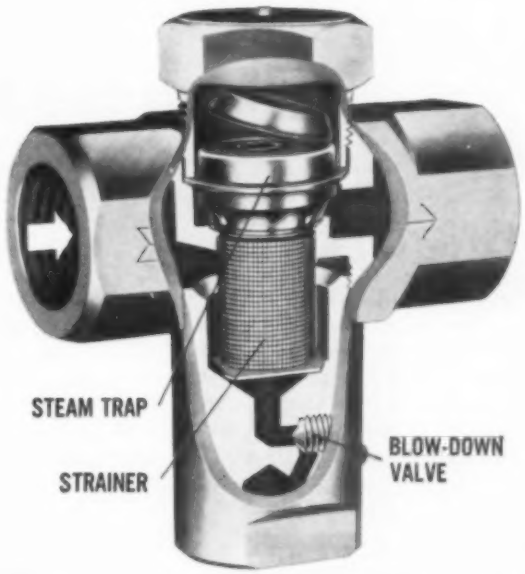
Yarway Series 130 Combination Steam Trap Wins Wide Approval

In chemical plants, refineries, other process plants, utilities, institutions—wherever condensate is handled in moderate amounts—this new Yarway Impulse Steam Trap is winning friends by the score.

Because it is a unique combination steam trap, strainer and blow-down valve, it offers these advantages no other steam trap can duplicate:

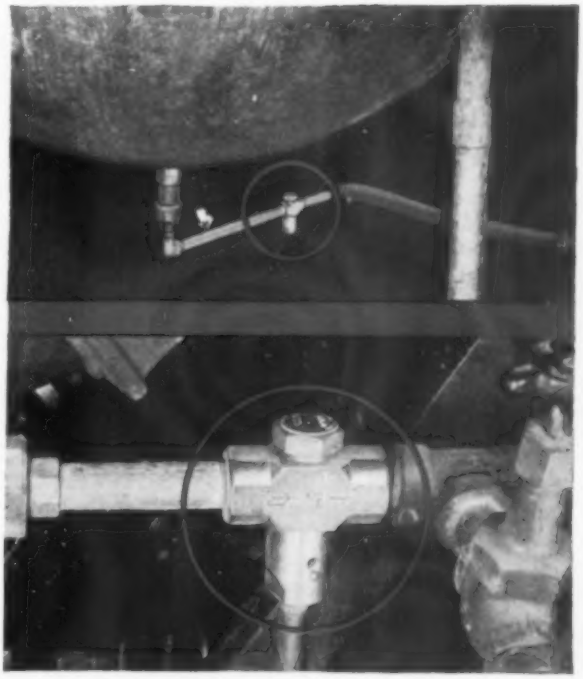
- IT SAVES SPACE—entire trapping hook-up requires no more space than a "T" fitting.
- IT SAVES MONEY—only one unit to buy and install, *up to 30% savings in time and materials.*
- IT SAVES WORK—easy to install, easy to maintain. Stainless steel construction. Good for all pressures 8 to 600 psi. Sizes ⅜" and ½".

Why don't *you* try a Yarway Series 130? Your nearby Yarway distributor can supply you—or write for Yarway Bulletin T-1743B.



CHEMICAL PLANT REDUCES CORROSION FAILURE —LIKES "COMPACT" DESIGN

For years, traps and strainers of iron and steel were subject to HCl and H_2SO_4 acid corrosion failure in this chemical plant. Installations lasted only a few months. Now Yarway Series 130 steam traps are solving this corrosion problem because the trap, strainer and blow-down valve are combined in *one stainless steel body*. In addition, trapping hook-ups on processing kettles are greatly simplified.



LAUNDRY OVERCOMES SPACE PROBLEM...GETS FASTER HEAT-UP, NO WATER HAMMER

Space was at a premium for steam trapping around the presses in this laundry, and also they couldn't get fast heat-up without water hammer. Yarway Series 130 combination steam traps solved all three problems to their complete satisfaction.

Centrifugal Pump Clinic

QUESTIONS and ANSWERS
Conducted for SPI Readers

By
IGOR J. KARASSIK
Consulting Engineer and
Manager of Planning
Harrison Division
Worthington Corporation

How to Limit Bearing Abrasion

QUESTION:

I HAVE A SERIOUS pump problem which appears to defy solution.

Any comments relative to suggested methods of improvement would certainly be appreciated.

In essence, we use 2- and 3-inch vertical sump pumps of the type illustrated in the sketch. Approximately 100 of these pumps are installed to handle a very abrasive slurry containing approximately 10% maximum solids. There is no appreciable chemical attack. Pump lengths vary from 6 feet to 15 feet.

We have been experimenting with a pump in an effort to determine the best shaft material and sleeve bushing. These are the points of failure. The pumps are fitted with 316 stainless steel columns, cast iron housings and impellers. All run at 1750 rpm.

We find that we have never gotten over 700 hours operating time (the pumps are on a 24 hours/day service). This was with crushed glass-teflon sleeve bushings and cold rolled shafting (1⅛") with about 0.5 gpm flushout water to each of three bushings.

After about 700 hours the pump began to vibrate excessively and had to be pulled. Examination showed one of the crushed glass-teflon sleeve bushings had "disappeared" and the other two were badly pitted, with mud particles embedded. The cold rolled steel shaft was severely necked down at each sleeve bushing location.

We have tried the following materials, with not as much success as above:

1) Brass Bushings (Brinell 55) with cold rolled shafting.

2) Urethane Polymer Bushings with cold rolled shafting.

3) Cast Iron Bushings with cold rolled shafting.

4) Copper - Graphite Bushings with cold rolled shafting.

Our latest experiments have been with Stoody "6" bushings (400-500 BHN) and cold rolled shafting. We found little wear on the bushings but great wear on the shafting. Service life was about 200 hours.

We are contemplating using Stoody "6" bushings with Metco sprayed molybdenum hard surface shafting and, in theory, hope to make a miniature crushing roll out of each bushing and shaft area and flushing out the resultant finer particles. Normal clearances of 0.015-0.020" are used on these materials. Operating temperatures are about 65 C.

Can you furnish us with some suggestions? Is our approach toward a "crusher roll" correct? How rigid must the vertical pump and motor be on the tank mounting flanges to prevent minute vibrations which may ultimately increase, causing "whipping" at the foot of the shaft? Evidence lends itself to the belief that these vertical motors are not mounted rigidly enough. What is the effect of oversize shafts toward "whipping"?

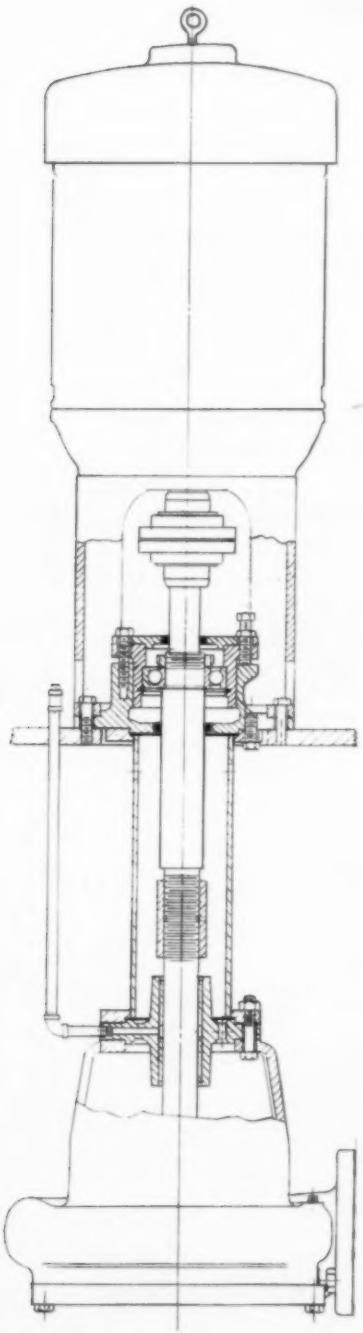
ANSWER:

IN MY OPINION, the major source of the difficulties you have been encountering lies in the fact that the pumps you describe are essentially water pumps designed for sump dewatering service and not process pumps. They are, therefore, far from being rugged enough to withstand the severe service to which they are applied.

While the material selection has been upgraded to improve the potential life of such parts as the pump columns and the bearing bushings, the sole effect is to lengthen the life of these parts slightly over what it would be with standard construction — for instance with standard bronze bushings — the mechanical inadequacy is hardly improved.

The major problem seems to be the fact that the shafting appears to be too light and probably "whips" to a considerable degree.

I do not know what is the critical speed of these pumps and, therefore, what is the magnitude of the deflection, but from all appearances this is a "light" construction with a considerable tendency to accelerate wear in the bearings regardless of the materials used there. Even if clear, filtered flushing water is supplied to the bearings, slight unbalancing forces and shaft vibrations send the shaft to one side or another — all the clearance exists on the opposite side and dirt particles get in to cut the bushings or the shaft.



It appears to me also that the clearances of 0.015" to 0.020" that you mention (and which I assume are diametral clearances) are too liberal to permit the bushings to act as good steady bearings. A diametral clearance of 0.004" to 0.005" would be the maximum which could be relied upon to give adequate bearing action.

Over the years, there have been three schools of thought on how to minimize the rate of cutting at such bearing surfaces:

a) Make very hard surfaces.

b) Provide an elastic surface on one element that permits depressing the foreign particles into the material during the rubbing process.

c) Exclude *any* foreign particles from the bearing area.

The first method has seldom been applied to vertical sump pumps because it is expensive and because it only reduces the rate of cutting. Even when the additional cost of the materials may be justified because of the severity of the service, as in your case, I doubt that alone this method will be satisfactory since it may not provide an acceptable life to the parts. The "crushing roll" effect has its limitations.

The second method, that is of providing an elastic surface, involves the use of a liberal jet of clean water and a lot of longitudinal grooves into which the foreign particles may be dumped and washed away after being "rolled" by rotation to the grooves. This is the "cutless rubber bearing" solution that has frequently been used for wet pit pumps handling water with some sand particles.

Whether it would be practical in this case is hard to say, but I doubt that it would be effective with the concentration of mud that you encounter. Furthermore, experience has shown that cutless rubber bearings are a failure unless properly flushed down before the pump is started.

The third solution, especially if combined with the hard materials of the first one, is the procedure that I would recommend. The complete exclusion of mud particles from the bushings, however, would require in my opinion considerably more than the 0.5 gpm flushing water that you mention, even if the clearances are reduced to the 0.004 or 0.005" that I recommend. While one could calculate the amount of water required, given the diameters, the clearances and the grooving, I believe that a figure of from 2 to 3 gpm is more nearly the required quantity.

Actually, rather than a specific flow, it is necessary to provide a sufficient differential pressure to insure flow in the desired direction and accept whatever flushing flow this will give you. With a liberal flow flushing into grooved or tapered bushings, it should be possible to assure elimination of abrasive particles within the bearings.

Now as to materials: assuming that shaft size cannot be increased but that clearances of the order of 0.005" can be provided and that you will supply clear filtered water to flush mud particles, the choice that you contemplate is in the right direction.

Stoody "6" bushings with either "Metco" sprayed shafting or Colmoney, Stellite or ceramic surfaces on the shaft should result in a considerable improvement of pump life. We have also found that "Graphitar 39" is an effective material for bearings to use in conjunction with hard sleeve materials in this type of pump.

Of course, if heavier shafts can be incorporated in the pump construction you will decidedly get further improvement of the pump life between overhauls.

The motor mounting must be quite rigid and, of course, "square" so as to avoid vibration on one hand and a "cocking" effect of the shaft running in the bearings. Proper alignment assumes greater importance where accelerated wear at the bearings can lead to the entrance of abrasive foreign particles into the clearances and further acceleration of this wear that leads to ultimate failure.

I will certainly be interested in learning what improvements are obtained from the use of closer clearances, adequate supply of clean flushing water and harder materials.

MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Effective Civil Defense Program

Question . . . . . .

WHAT ARE THE BASIC ESSENTIALS for a reasonably effective Civil Defense program? We operate a small manufacturing plant and can't afford extensive or elaborate facilities.

Suggestions . . . . . .

CONSULTATION with the local Civil Defense office, if you have one, is always a good idea. A letter to the Office of Civil and Defense Mobilization, Washington 25, also will provide information on CD programs.

Here is a list of actions by Management generally considered essential, if the program is to have significant value:

1. Designate an individual to serve as the project coordinator or director. This man should be an engineer or experienced supervisor who is familiar with the machinery in the plant, the everyday hazards to operation, and the potential consequences of an emergency developing in any plant area. If Civil Defense is regarded by management as Emergency Defense, in which enemy attack is only one special possibility, the overall value of the program becomes much clearer.

2. Provide a combination communication and control center to which various departments and groups may appeal for prompt information and directions. In a small plant, the telephone switchboard area might be considered as a promising location for the center, in order to take advantage of the equipment already there.

3. See that adequate defense gear and tools are set in strategic locations. This includes fire fighting equipment, gas masks, axes, helmets, etc. And don't forget to check the fire plugs and hoses at least three times a year. Otherwise an emergency may bring unpleasant surprises.

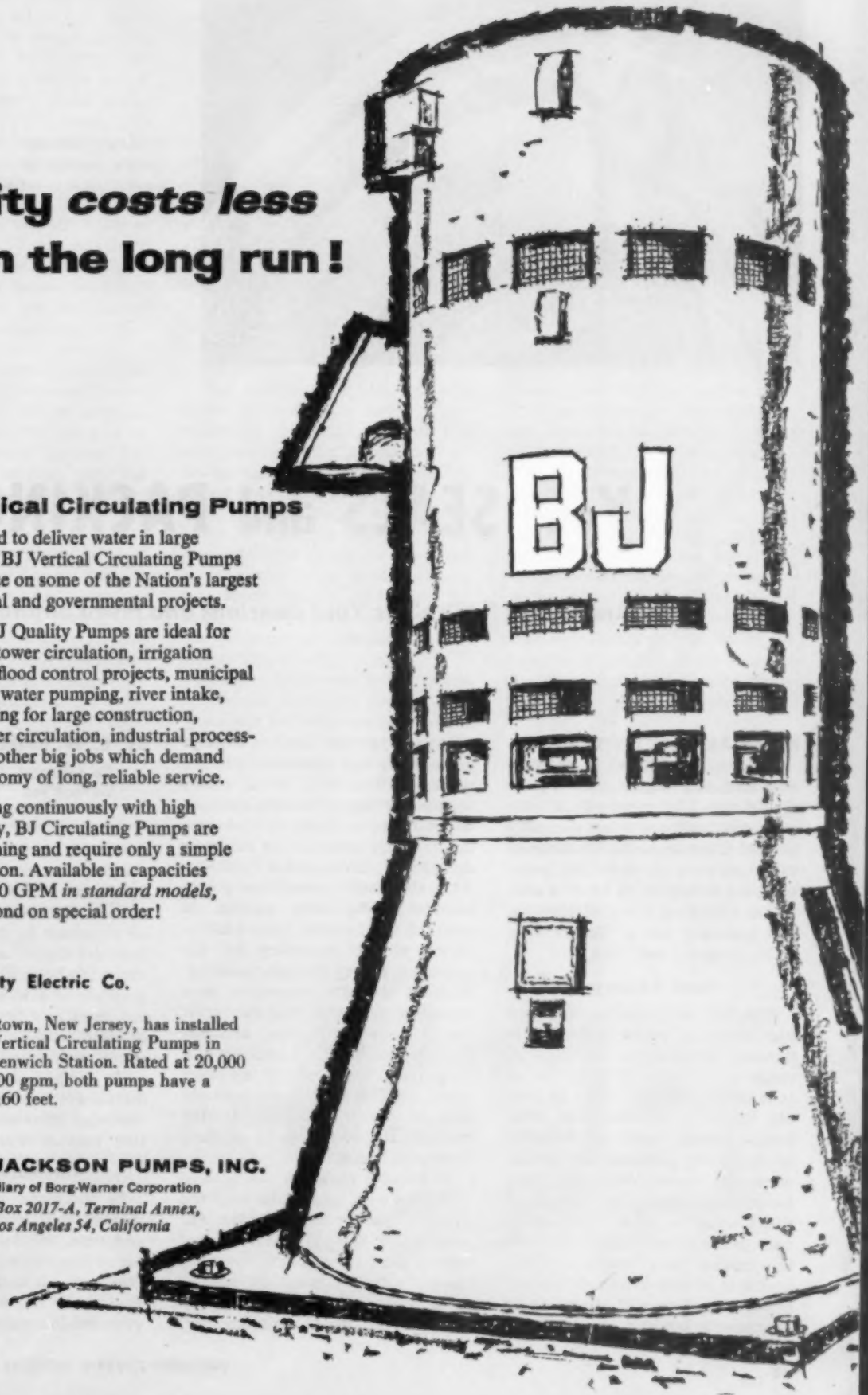
4. Provide a safe place for important records and documents, and make clear who's to put them there when the emergency signal goes off.

5. Prepare and promulgate to *all* employees a plan that shows who is to do what, where and how. Realizing that under some conditions a general abandonment of the plant for all except the defense teams is desirable, the plan should indicate ways of exit or escape. Selected areas in buildings of heavy concrete construction often provide good emergency shelters and these areas must be identified.

6. Run a drill periodically to make sure all participants are familiar with their duties and able to carry them out without confusion.

And the cost of this? Most, if not all of the capital expenditures are tax deductible. As for time lost in drills, this is simply an insurance premium against far greater losses that could result from panic and confusion.

Quality *costs less* in the long run!



BJ Vertical Circulating Pumps

Designed to deliver water in large volume, BJ Vertical Circulating Pumps are in use on some of the Nation's largest industrial and governmental projects.

These BJ Quality Pumps are ideal for cooling tower circulation, irrigation service, flood control projects, municipal primary water pumping, river intake, dewatering for large construction, condenser circulation, industrial processing and other big jobs which demand the economy of long, reliable service.

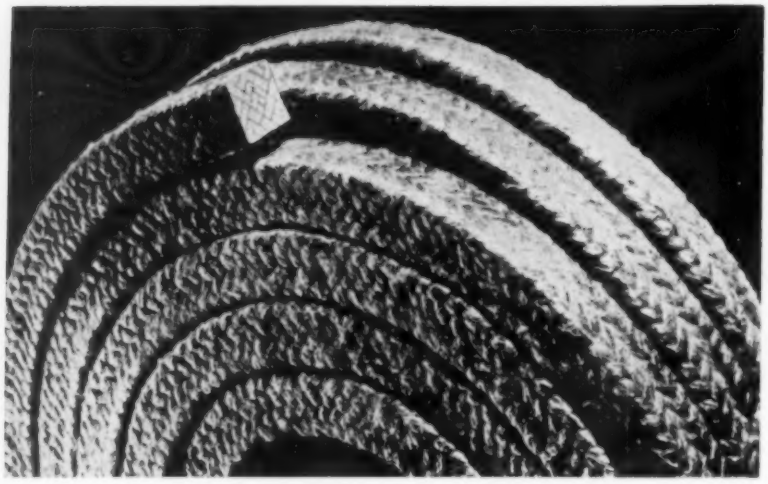
Operating continuously with high efficiency, BJ Circulating Pumps are self-priming and require only a simple installation. Available in capacities to 50,000 GPM *in standard models,* and beyond on special order!

Atlantic City Electric Co.

of Gibbstown, New Jersey, has installed two BJ Vertical Circulating Pumps in their Greenwich Station. Rated at 20,000 and 10,000 gpm, both pumps have a head of 160 feet.

BYRON JACKSON PUMPS, INC.
Subsidiary of Borg-Warner Corporation
P.O. Box 2017-A, Terminal Annex, Los Angeles 54, California

BW



Braided packing. Note cross or lattice weave of material for increased durability.

Your SEALS and PACKINGS

Are Just as "Alive" as Your Bearings and Need Similar Attention

By E. W. FISHER
Co-ordinator, Technical Services
Garlock Inc.

SEALS AND PACKINGS are both commonly defined as deformable elements employed in a joint to minimize or eliminate fluid leakage; and both are used statically as well as dynamically. Underlying this similarity in function, however, is a difference in form: a seal, unlike a packing, is self-tightening, and generally has a "lip" or specially prepared seal face.

Jamb Packings

The first consideration of packings discussed below is limited to dynamic applications of the broad range of non-automatic devices — that is, to jamb packings as they are employed between two relatively moving surfaces. Included among these packings are braids, duck and rubber coils and rings, jacketed packings, and certain of the plastics — bulk mixtures of various fibers; solid lubricants such as graphite, mica, or moly-sulfide; and bits of soft metals commonly bonded together with grease or an elastomeric binder.

Since dynamic jamb packings are used to seal relatively moving surfaces, they are, in a sense, unique bearings — unique because every effort is made to *eliminate* an oil wedge between the surfaces, and to maintain so-called "contact" with the shaft around its entire periphery. No true contact is established, of course, since a lubricating film is necessary for the operation of any dynamic packing. Without the film excessive heat would be produced, and the result would be wear, scoring, and destruction of both the packing and its journal, the shaft. On the other hand, the film must be exceedingly thin to prevent it from flowing through the clearance to produce excessive leakage.

In braided packings, the type of lubricant employed varies with the specific function of the braid. For cold water service a water-proof grease must be supplied; for work against solvents, castor oil, soap or hydrogenated fish oil may be used.

Duck and rubber rings are normally impregnated with a mineral oil, but occasionally must depend upon water which they attract in service. For plastic packings, the oil or grease in the binder usually provides the initial lubrication, and there is also a high percentage of graphite or similar material which functions as a dry lubricant. Some of the plastic packings contain bits of soft metal, such as babbit, resiliently supported in the mix. The metals are in themselves excellent bearings; combined with the plastic they provide superior service.

Automatic Packings

In automatic packings, such as molded V, U, and O-rings, flanges, and cups, the fluids being handled act as lubricants. Since these packings are automatic, they squeeze the shaft more tightly as the pressure increases. The film is thus

thinned and the probability of leakage is decreased.

The lubricant is drawn by the shaft under the packing by the reciprocating action of the rod or piston. Consequently these packings are not generally used with rotating shafts. Because of this "drawing action," lubrication engineers have attempted to determine the ideal shaft surface. Under normal conditions, a surface finish of between 16 and 32 rms has been found most practical. This degree of roughness produces excellent pockets to carry the lubricating liquid under the packing with a minimum of cutting or wear.

With high pressures, a finer finish (approximately 8 rms) is considered necessary, and in extreme conditions a finish of 4 rms is used. These recommended surface finishes may vary slightly with the lubricity of the liquid, its ability to wet the shaft, and the type of packing.

Metal packings, in the form of floating segmental rings held in initial sealing relationship with the rod or cylinder by a spring, are also in this category. They require that the lubricant be drawn under the rings by the reciprocating rod.

Where such lubricant is not present in the gas being handled (this packing is normally for high pressure gases or steam) lubrication must be provided from external sources. Recently some good results have been achieved on dry gases, where the temperatures are low without external lubrication, by using "dry" bearing materials such as special mixtures of TFE.

Oil Seal

The oil seal, a lip type packing, is designed for non-pressure service; however, it does act automatically under pressure. Since it operates on a very narrow band, any fluid loading must be kept very low to avoid excessive unit loading on the wear band which would burn up the seal.

Under seal design conditions of no pressure it cannot be automatic; however, such action is achieved by building in spring loading. A finger or coil spring is provided around the lip thus forcing it inwardly against the shaft. The loads used are low, normally ranging from ¼ to ¾ pound per linear inch of circumference. High pressure-velocity ratios are not satisfactory in oil seals.

Lubrication and Adjustment

Another method of introducing the lubricant employs the oil cup, and depends upon the lantern, an annular ring having a spool or H-shaped cross-section. The lantern ring is provided with annular grooves (one each on the I.D. and O.D.), which are interconnected by a series of holes through the remaining web. A lubricant, introduced through the side wall of the stuffing box, fills the voids in the lantern, thus reaching the shaft and packing.

The stuffing box lantern ring serves not only as a means of introducing the lubricant, but also as a reservoir for it, and may be fed by a grease cup, by a drip oiler, by oil under pressure.

An oil bottle may be used to good effect in keeping the oil under pressure. The bottle is energized by pressure from the discharge side of the pump; and since the shaft is on the inlet side, the discharge pressure creates an adequate differential.

Another applicable device is the differential cylinder, used chiefly when it is desirable to maintain the pressure in the lantern at a slightly higher level than in the medium being packed. The differential pressures involved are not great, generally ranging from five to ten pounds.

Finally, it is possible to employ a completely independent lubricating system, which may operate either continuously or intermittently.

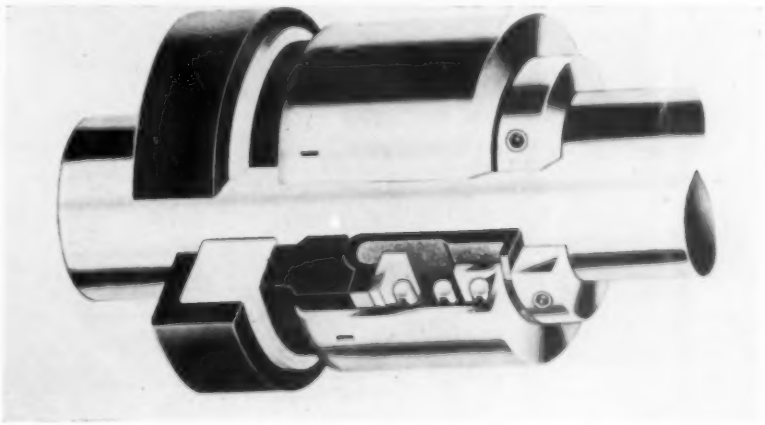
Besides serving as a means of introducing the lubricant and as a reservoir for it, the lantern ring also performs another function: cooling. By locating an outlet equipped with a by-pass valve on the opposite side of the stuffing box, it is possible to adjust a constant flow of the lubricating agent to the packing and around the journal, thereby removing a high percentage of the heat generated inside.

The thin film which lubricates a packing is also used as a sealing agent. Since it is generally introduced at a pressure several pounds higher than the fluid being handled, co-mingling is expected. For this reason the two substances must be compatible. In packing mayonnaise, for example, Pure Food Regulations must be observed: vegetable or cotton seed oil is often used as the lubricating agent.

Other examples are more obvious: one would not use glycerine in the lantern ring or seal ring of a pump that was pumping nitric acid — nitroglycerine would be formed. The object, in all cases, is to assure compatibility while maintaining the greatest possible lubricity.

Adjusting a set of soft (non-automatic) packings should be accomplished by tightening the gland stud by not more than one flat of a hex nut at a time, after which the packing should be allowed to run uninterrupted for 10 or 15 minutes. Any attempt to eliminate leakage completely is almost certain to re-

Typical mechanical seal.



Copes-Vulcan automatic boiler control at Hammermill Paper Company

Gives good results on steam generator fired with hogged bark and coal

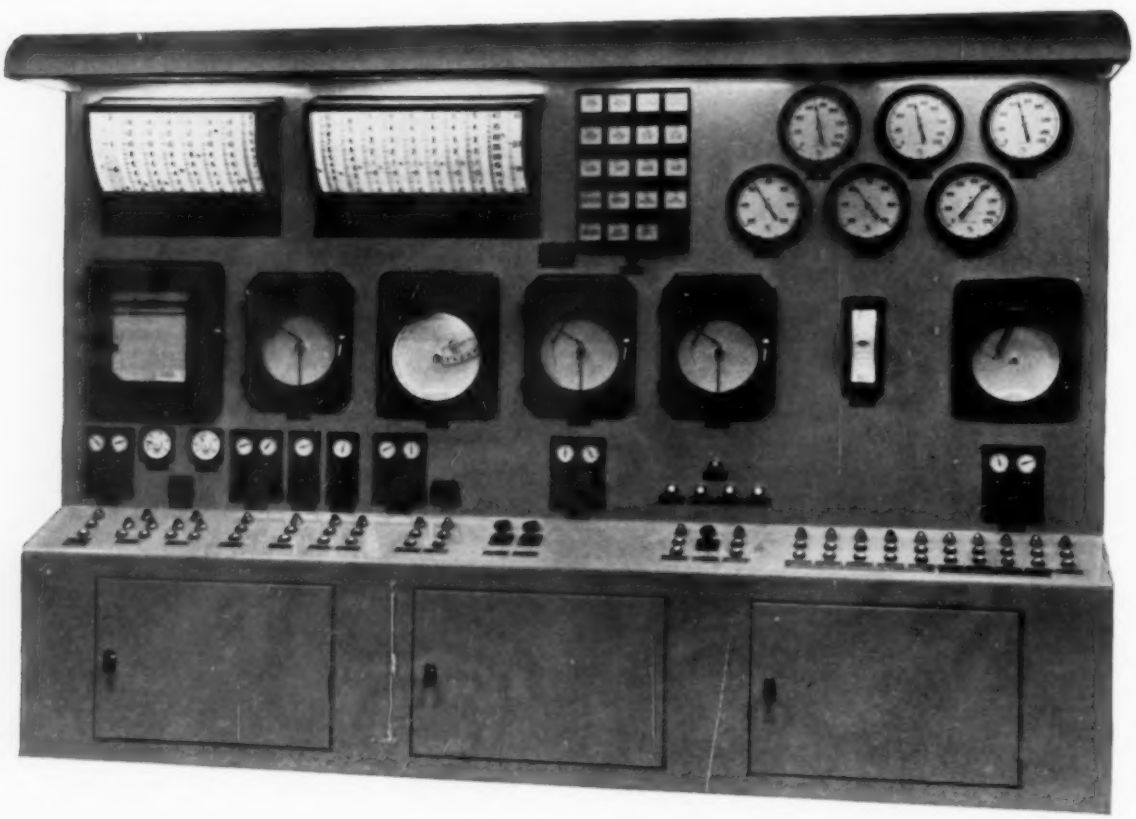
Here was an unusual problem of boiler control. Two solid fuels—hogged bark and bituminous coal—were to be burned in combination. The Riley steam generator, with nominal rating of 206,000 pounds per hour at 675 psig and 760 degrees F., was to deliver power and process steam to the same main header as all other existing boilers. Low steam costs and high boiler availability were a goal of the design and operating engineers.

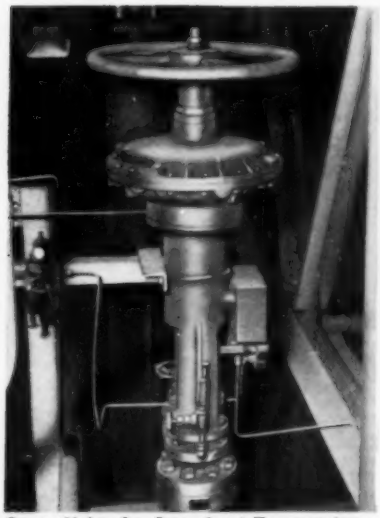
Copes-Vulcan combustion control has given high operating efficiency by close control of excess air. It has minimized fuel-bed disturbances by keeping the flow of air through the bed at the lowest practical rate. It has handled intermittent flows of waste fuel without incident. It has required no manual adjustments for variations in fuel moisture or quality, or in kind of fuel.

Copes-Vulcan three-influence feedwater control has maintained the proper drum level while feeding exactly as needed for steam output. Regardless of load conditions, Copes-Vulcan control has maintained final steam temperature at the desired 760 degrees F.

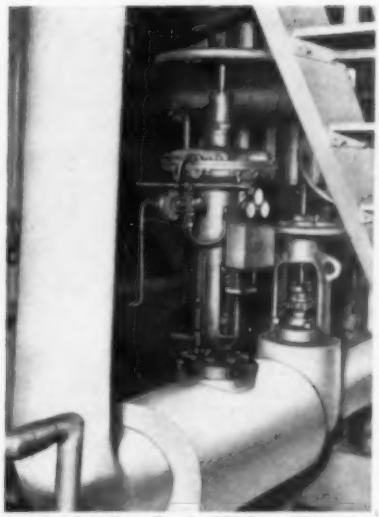
The complete story of this unusual installation is told in new Bulletin 1078. Write for it.

Central Control Panel. All recorders and controls for the bark-and-coal-fired boiler are centralized on this Copes-Vulcan panel.

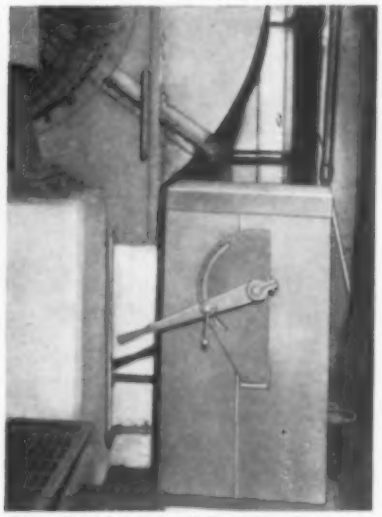




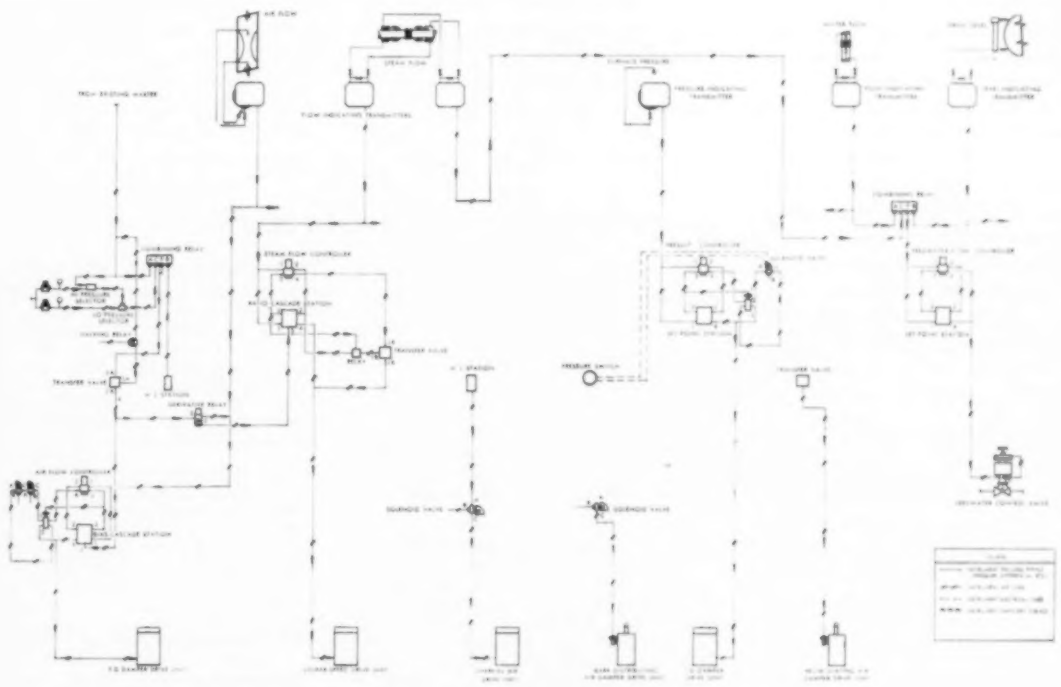
Spray Valve for Superheat Temperature Control. This Copes-Vulcan Type CV-D Spray Valve introduces cooling water into the superheater for dependably accurate steam-temperature control.



Feedwater-Flow Control Valve. This diaphragm-operated Type CV-D valve is part of the Copes-Vulcan three-influence feedwater control system.



Drive Unit for Forced-Draft Fan Damper. This Copes-Vulcan drive unit, one of several in the control system, positions the forced-draft fan damper.



Schematic diagram of the Copes-Vulcan combustion and feed-water control systems on the bark-and-coal-fired boiler at Hammermill Paper Company.

Copes-Vulcan Division

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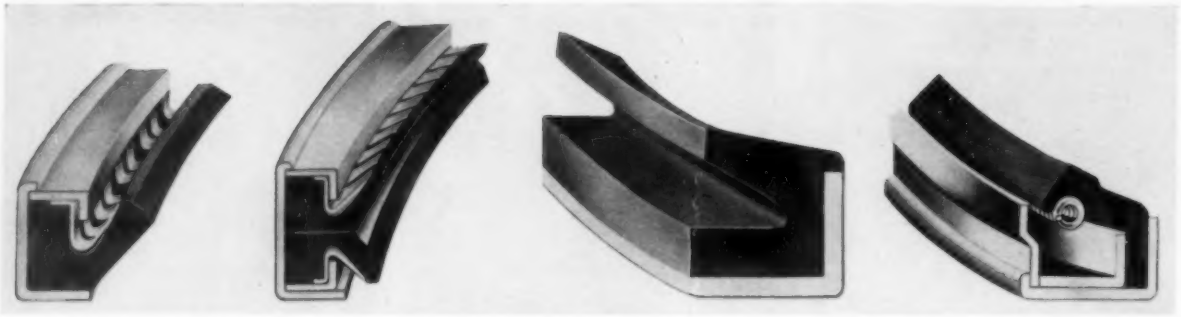
Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves



Oil seals showing various cross sections. Two views at left show finger springs to maintain lip contact with shaft. Section at top right shows use of a garter spring. The seal at right center has no mechanical means of strengthening the lip.

sult in a burned-up set of packing, often in a few minutes' time.

In cases where the set is in good condition and still contains adequate lubricant, the lubricant acts as a safety valve. If the packing is over-tightened, friction becomes excessive, heat is produced and the set tries to expand, the lubricant becomes thinner and more mobile and is squeezed out. Thus the volume of the set decreases and equilibrium is reached. However, should there be insufficient lubrication left, the result might be a cloud of smoke, destroyed packing and a scored journal.

Automatic packing should not require adjustment. Cups, U's, O-rings, V-packings, flanges, and so on, have a predetermined depth of the stuffing box or axial space between the retaining surfaces.

Replacing Packing

In replacing packing, cleanliness is the major factor to be considered. Rings should be carefully slipped into place with joints of soft packings staggered. They should be positioned true and square and free of all foreign matter. A split wooden block or cylinder that one can slide into the box can be used to tamp the packing in place uniformly.

After the stuffing box has been filled, it should be tightened up snugly, then backed off to allow the packing to expand. In this manner, provision is made for a certain "looseness," so that the pump can be started up without danger of overheating or damaging the packing or journal in any way. The shaft and especially the piston and the rings supporting it must also be checked to ensure that it is true and properly supported.

Clearance

In high-pressure work, precautions concerning clearance must be observed, since failures in the operation of automatic packings, cups, O-rings, and V's are most often caused by extrusions into the clearances. Elastromeric materials, whether used alone or as a binder in a fibrous packing, are deformable. Even with recommended fine clearances, the O-ring requires special back-up or anti-extrusion rings above 1500 psi.

Under several thousand pounds of pressure, very fine clearances, on the order of one or two thousandths, are required. If such close tolerances are not practicable (as is usually the case), a strong back-up ring is considered necessary. These rings range from the familiar adapter rings used with V-rings to metal-backed cups.

PACKING SELECTION

The choice of a packing is not an easy one to make, since thousands are available. A brief guide, however, might be useful:

BRAIDED packings are manufactured from a variety of fibers, including cotton, flax, jute, ramie, asbestos (both blue and white), Teflon, rayon, nylon, and dacron. Some of these packings are equipped with metal jackets.

METAL makes a good bearing. When used around a core to make a foil jacket, shaft movement beyond that which a solid piece of metal can handle is normally expected. The core provides the resilient springback to the metal surface. Most such packings are used in rotary service or mild reciprocating work.

COIL and ring packings are fabricated from duck and rubber, and are generally used in reciprocating work. Occasionally, however, they come into service as end rings for rotary service as well.

MOLDED and automatic types of packings, some of which are reinforced with certain of the fibers mentioned above or they may be a homogeneous rubber compound, are generally used for reciprocating work.

FLOATING metal packing — segmental rings of packing generally held in initial contact with the shaft by means of a garter spring circling the surface of the ring — are manufactured of cast iron, bronze, phenolic, carbon, and Teflon. This type of packing is used almost exclusively for high pressure reciprocating work involving gases.

OIL SEALS normally employ a nitrile rubber element, although other elastomers and leathers are sometimes used. The seal is used more often for rotating service than for reciprocating service and is designed for "non-pressure" applications.

MECHANICAL seals, though expensive, are probably the most efficient packings. They are used exclusively for rotary service, and are manufactured from many materials and combinations thereof, metals, ceramics, plastics, elastomers, carbon, etc.

Perhaps the best solution to the problem of selecting the proper packing material is to call a packing representative who is trained in the field and backed up by a large group of engineers and technicians — the man most likely to make the right choice.

Seven Important Steps in Compressor Maintenance

PERHAPS the most neglected piece of equipment in an industrial plant is the air compressor. Compressors are so rugged and long-lasting that many plant operators feel safe in locating them in inaccessible spots, out of the way corners, and in dirty surroundings.

Actually, the correct location of a compressor is the initial step toward its proper maintenance in the future. It should be installed in such a way that the intake will not suck in steam from a nearby operation, or acid fumes from a plating installation, or grit from a grinding operation. The intake should be run outside if possible.

Here are other brief points to check off for correct compressor maintenance.

1. Check compressor intake filter once a week. Clean at least once a month, or more often in dirtier conditions. Install a better filter than supplied with the compressor if necessary.

2. Check the lubricant level in crankcase frequently. Replace oil according to manufacturer's recommendations.

3. Regularly check air gauge on tank and see that compressor cuts off at the same pressure as when originally installed.

4. With the compressor off, and discharge valve closed, pull the safety pop-off valve. Then note when the compressor starts up and record (as permanent record) the length of time it takes for the compressor to build up to shut-off pressure. When this time gets appreciably longer, it is a sign that the valves and/or rings need maintenance.

5. Inspect the belts regularly to be sure they are not wearing or slipping. Adjust their tension when necessary and use regularly prescribed preventive maintenance ideas regarding drive belts. Always remember that V-belts may be too tight, rather than too slack.

6. Install an automatic-operating tank drain to keep compressor receiver drained of all moisture—and make sure that it keeps working.

7. Be sure the electric motor does not start up against air pressure in the compressor head. Compressor unloader must be checked regularly to prevent motor burnout.

SUMMARY

There are two things that may be singled out as more important than others: Keep oil in the compressor head, and water out of the receiver tank. When oil consumptions begins to get excessive, the rings need replacing. Do it without delay. Dirty, used crankcase oil should not be allowed to enter the compressed air system past the piston rings. It not only carbons the compressor valves, but coats the entire compressed air pipe system, gums up air valves, varnishes air cylinder walls, ruins painting operations, and so forth.

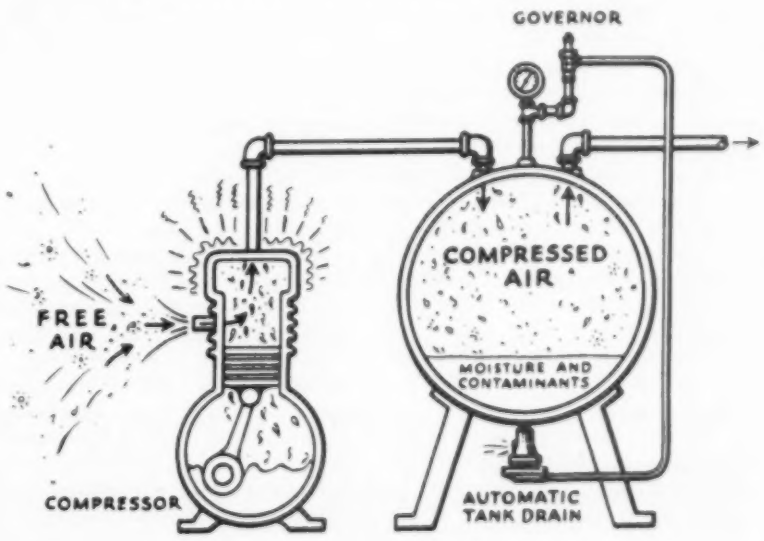
Illustrated is a typical automatic tank drain, and a diagram showing its easy installation. This is seldom included by a compressor manufacturer because of the competitive situation in the air compressor market. If you are buying a new compressor, insist on a tank drain in your quotations. If you do not have one, consider its purchase in the light of the following facts.

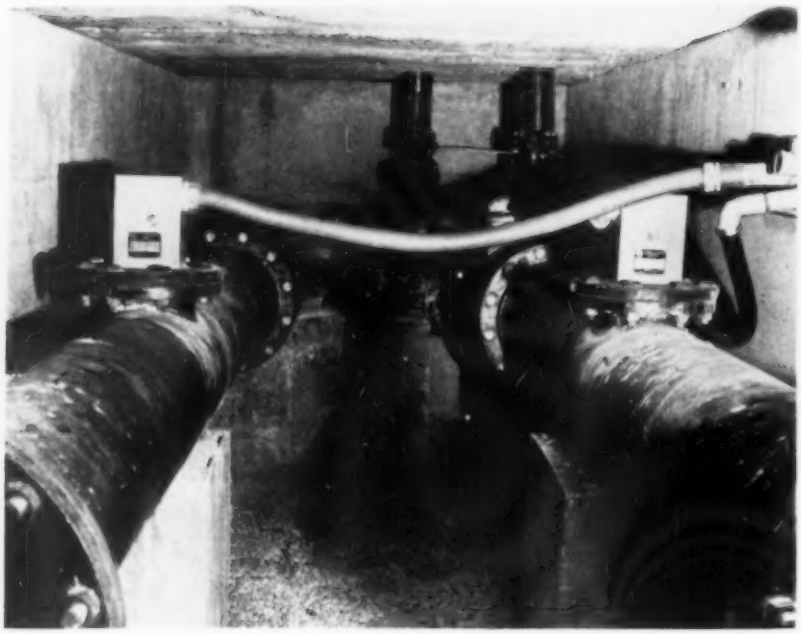
A compressor is carefully designed with three major parts in mind: the compressor head, the motor and the tank. Each is sized to one another by design. You wouldn't think of putting too small a motor to drive the compressor, nor too small a head for the air required, yet often a plant man unbalances these careful designs by letting water build up in the tank.

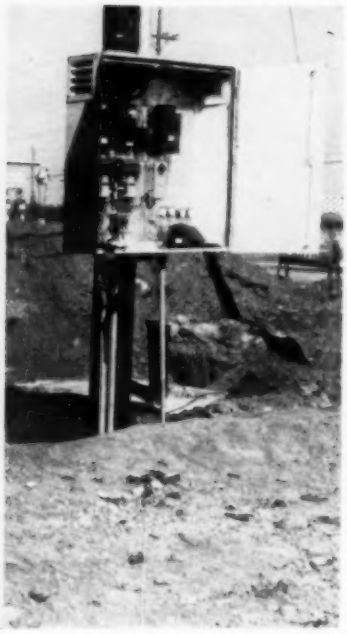
Since water is not compressible, it occupies valuable air storage space. It causes the compressor to run more often, wasting power and cutting compressor life. It causes excessive humidity in the air during its storage, which carries over into the air system. It also causes tank corrosion, and if excessive oil is present, it can lead to an internal tank explosion. Get an automatic tank drain and eliminate the human element of draining daily.

By DON BENNER
Wilkerson Corporation

Typical installation of tank drain on a compressor.







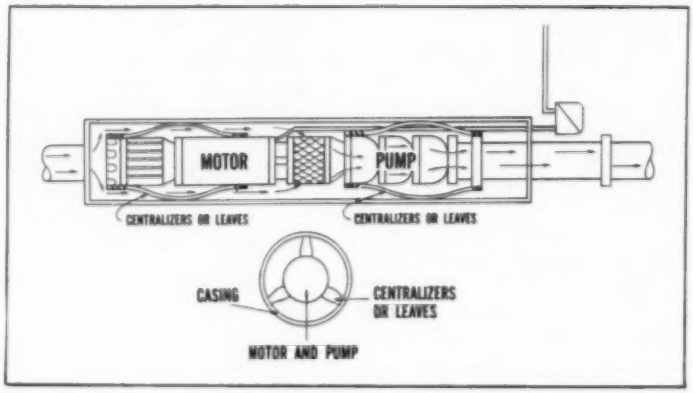
Submersible Booster Pumps - - Kansas City

SUBMERSIBLE motors are finding increasing usage in application to in-line booster pumps. The space-saving and noise-suppression aspects of such applications, plus the lowering of maintenance requirements due to the trouble-free performance, combine to make their use attractive.

When installed in shallow vaults, as illustrated, the units are tamperproof, are not vulnerable to accidental damage, and leave no above-ground obstruction. A manhole is all that need be exposed.

The horizontal booster installation illustrated herewith is part of a municipal system, drawing water from the Kansas City water system into the Jackson County Water District in Missouri. It consists of two pumps in parallel operation, both driven by U. S. Electrical Motors Inc., submersible pumps. A regulating valve is provided to balance the pressure between the two outputs.

This provides three capacities — one 40 hp, 1800 rpm motor driving one pump; or one 60 hp 1800 rpm motor driving the other pump; or both capacities combined by simultaneous operation. Safety devices are used on the discharge side to prevent operation, if for some reason the flow of water should stop.



It was known that road building work would take place in the vicinity of this installation at a future date. The installation was therefore designed to prevent possible damage from the earth-moving equipment and other heavy machinery used in road construction. As installed, a street could go right over the booster pumping vault without need for any rework.

Municipal water system booster pumping station of the Jackson County (Mo.) Water District consists of a control box on a utilities pole, right, plus a buried vault containing two Layne pumps powered by 40 hp and 60 hp submersible motors. A ventilator and the control box are the only above-ground portions of installation. Silent operation and protection from tampering or accidental damage, plus easy access, are making this type of installation increasingly popular.

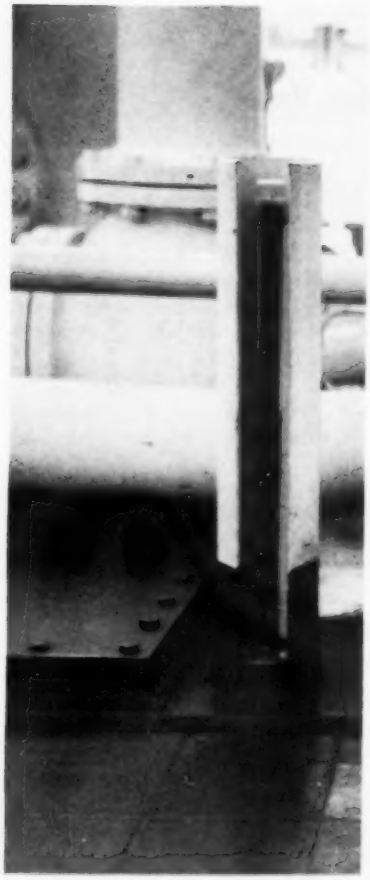
Guard for Floor-Level Oil Gauge

ON A GEAR CASE which is set at or near floor level, the glass which indicates the oil level in the unit is somewhat exposed, and is liable to damage when the floor is cleaned.

One plant remedies this situation by setting a section of pipe around the indicator, a portion of one side toward the operator's position being cut out to afford clear view of the float or oil column within the glass tube inside the pipe housing.

To aid visibility of the column within the glass, a narrow slit can be cut on the side of the guard opposite the viewing slit, or a series of half-inch holes may be drilled there to a height above which the oil indicator may be expected to rise.

By ELTON STERRETT
Houston, Texas



New Reliance Electro EYE-HYE

1. Indicates Boiler Water Level At Any Distance!
2. No Pressure Connections!
3. No Compensating Devices!
4. Any Number of Repeaters!
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6. Up to 3,000 p.s.i. Steam Service!

Choose either the exclusive Reliance Digital Readout (2 sizes) that shows water level with big illuminated numerals

OR

Use a Reliance Ten-Light indicator (3 sizes) with bright red lenses visible from any angle.

Now you can have unparalleled accuracy, simplicity and safety in a remote water level indicator with the new Reliance Electro EYE-HYE. All liquid connections are right at the boiler . . . no need for long pressure lines or compensating devices of any kind. One Electro EYE-HYE measures any variation in height you desire . . . can operate auxiliary alarms and/or fuel cutouts.

Free Literature explaining these and many other advantages available on request. Write today.

The Reliance Gauge Column Co. • 5902 Carnegie Ave., Cleveland 3, Ohio

Reliance® BOILER SAFETY DEVICES

Keeping Tab on Allen Station

(Continued from Page 27)

eration is made available.

Scanning speed is two points per second and the cycle period is approximately 2 minutes in each system. Off-normal or demand-log print out requires about five seconds. Speed during periodic logging is one point per second while the cycle period is approximately 4 minutes for each system.

All input signals are fed in as d-c voltages. Ranging and linearizing circuits are switched into service by signal relays as required.

Analog information signals from locally mounted measuring devices are converted to a standard voltage for use within the Information System. Nominal voltage is zero to three volts d-c, representing zero to full scale. Signals may be attenuated for scale factor purposes.

All digital information is carried by two distinct voltage levels which are represented by the symbols "ONE" and "ZERO." A ONE is a voltage of any positive value, normally from zero to plus 50 volts, while ZERO is a level below minus 15 volts, normally minus 25 to minus 50 volts. A ground signal is always a ONE and an open circuit is usually a ZERO.

Alarm System

Set point format is established by patchboard connections. Design includes digital type set points for high, high and/or low adjustable, or high-low and low settings.

The alarm storage has a capability for 160 input variables per system. Each time an off-normal measurement is detected for the first time, an off-normal log is made. At no other time will this be read out again until the input variables return to normal, whereupon logging is made of the point.

An off-normal log consists of time, unit number, point number and value. The value recorded on the readout consists of an underlined numeral.

Demand logs consist of time, unit number, point number, value and a "#" symbol which is used as an identifying feature of this type of operation.

Equipment Location

Readout printers which operate in conjunction with the control console and other controlling devices are mounted in the central control rooms under the operation's supervision.

The Information System cabinets which contain the electronic gear are remote from the control room. A total of thirteen junction type cabinets are required for both systems.

System Expansion

The information systems at the Thomas H. Allen power plant are designed to handle a maximum of over 900 points. The facility will have an ultimate capacity of 642 variables with 258 points reserved for programming. Initial input capacity is 186 points per system. Expansion of the system will require a minimum of wiring since only standard modules are used in the systems.

In the past, steam power plant instrumentation designs have employed a substantial number of multi-point recording devices to log cycle performance data. They are also used as scan type monitors for operating guidance and plant monitoring.

Larger units utilizing higher steam pressures and temperatures, require close control of critical variables, together with a greater number of essential measurements. In the Memphis plant, strip chart recorder functions have been consolidated and assigned to the automatic digital logging and monitoring system. Useful data is collected, displayed and recorded on preprinted log sheets and off-normal readings that occur during scan or log cycles are recorded.

The installation of the digital system is an initial step in the application of data processing in the power field. Equipment of this general type may be incorporated in future designs to permit automatic plant operation.

The Quick Closing Valve

THE LEVER operated, quick closing valve is a great time saver but it must be used with care and discretion. There are conditions under which it can be dangerous, as Jake, who had charge of the East Yard, promptly discovered one afternoon.

His experience may save some piping crew from getting caught in a similar error so here is what happened: Every afternoon Jake and his crew had to clean and tidy the East Yard as soon as the truckers were through and then give the cement slabs a hosing down to wash the dirt, oil and clutter into the catch basins. The truck loadings sometimes were late, although they were supposed to be finished by half-past four, and Jake then had to hustle his crew, and even at that they frequently were late in leaving the plant.

Jake pondered over this problem for some time and then came up with what he thought was a bright idea and this he proceeded to try. He located a two inch, lever operated, quick acting gate valve and installed it in place of the two inch standard screw operated gate valve at the end of the two inch water main. He next installed a quick acting hose coupling and was ready to really speed up the "hosing-down" job at this test slab.

The truck at this particular location was late that night and Jake personally dragged the two inch hose up, and the moment the truck was clear, he yanked the lever up and in seconds was washing down the slab—no time lost attaching the hose and opening a slow moving valve.

Ten minutes later Jake had the slab washed in record time and with a self satisfied grin he chopped the valve closed. The water flow never even paused as the valve and the hose sailed across

the slab and the water gushed from the water main with all threads stripped at the end. This was how Jake learned that it is dangerous to try to quickly stop a flowing column of water. So remember and never place a quick closing valve on a pipe through which a high velocity liquid may flow.

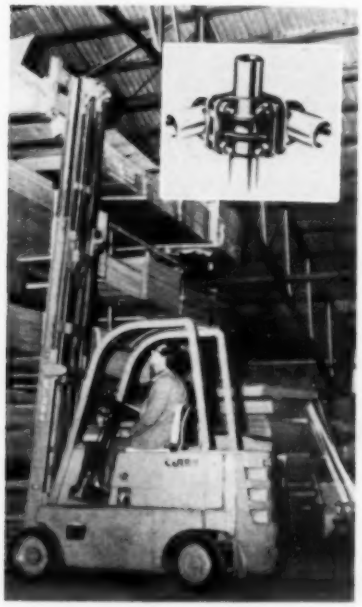
By GEORGE PEARCE
Albuquerque, N. M.

Louisiana Plant Uses High Space for Storage

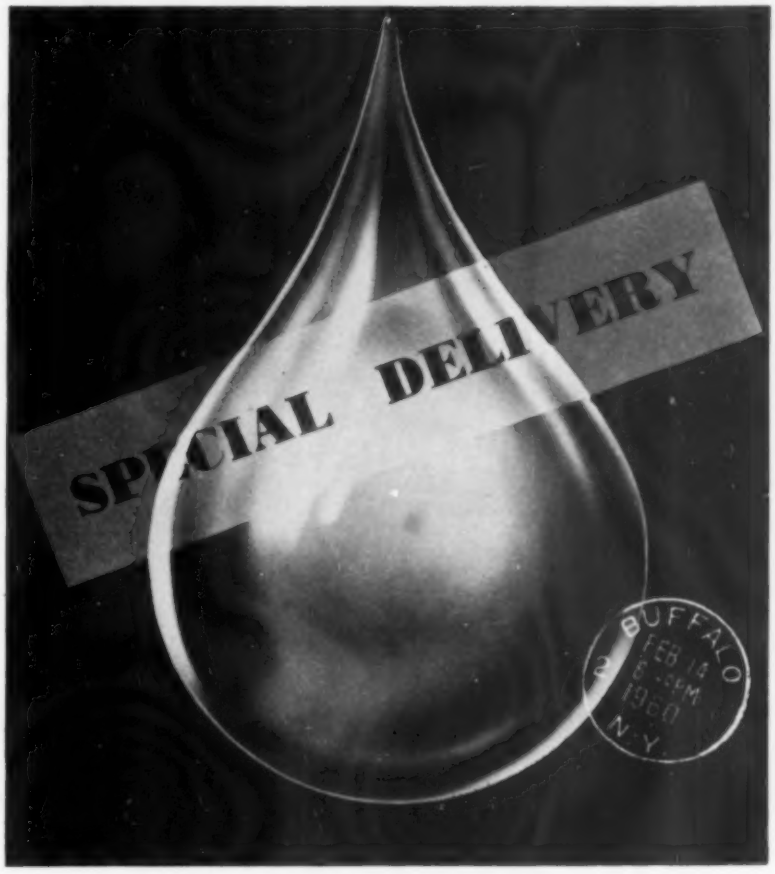
U. S. PLYWOOD CORP. at New Orleans uses Tube-Strut Universal Clamps for the construction of storage racks because of their flexibility and low cost.

The malleable iron clamps permit the use of standard new or used pipe in construction of storage racks, balconies and fixtures. One type clamp makes every connection. Installations are 100% adjustable, fast, simple and economical. All materials are re-usable should changes prove necessary.

U. S. Plywood employed ordinary pipe and these clamps to facilitate utilization of tremendous additional storage space in high positions, even in and around rafters in their Louisiana warehouse.

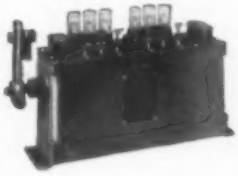


HOW FAST should you



deliver a drop of oil?

Whether you're operating high-compression diesels or fast-moving shear knives, you're probably paying more and more attention to lubrication *timing*. Whatever your field, our engineers will be glad to study your requirements and make specific recommendations. Your needs can be met either by adapting an existing model — or we will custom-build you your own lubricating system. Write for our catalog. Manzel, 257 Babcock Street, Buffalo 10, New York. You will get exact, on-time lubrication if you



ask the man from

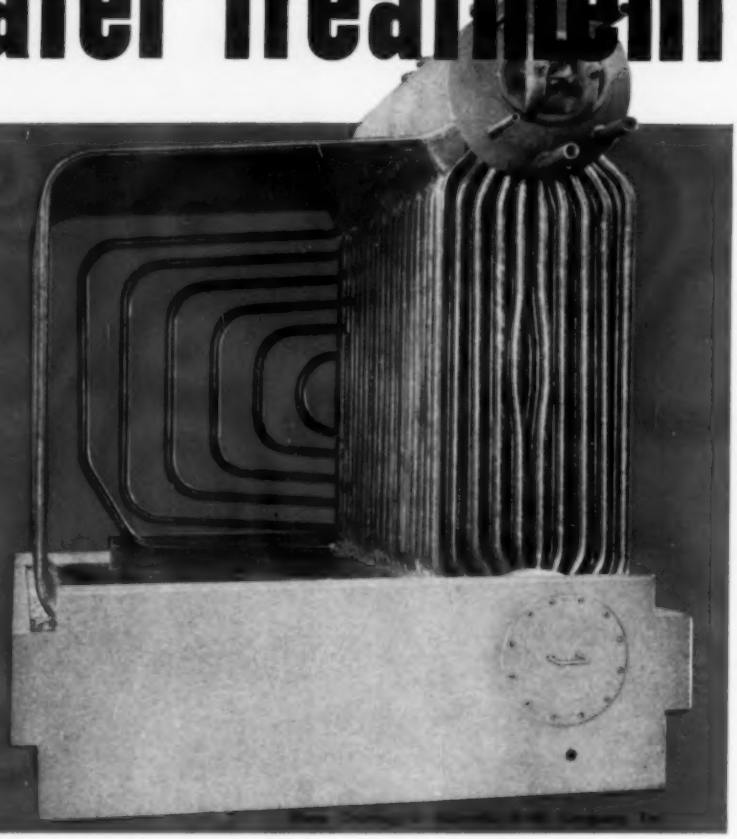
A UNIT OF HOUDAILLE INDUSTRIES, INC.

Manzel

SPECIALISTS IN LUBRICATORS AND METERING PUMPS SINCE 1898

anco water treatment

prevents efficiency fade-out... protects equipment against scale, rust, corrosion



The water used in heat exchange systems can be the cause of serious damage if precautions are not taken in time. Impurities in water cause rust, corrosion, scale, and sludge build-up. The best and most economical protection you can give your boilers, water heaters, tanks, condensers, air washers, spray heads, and similar equipment is regular use of Anderson water-treating chemicals.

BRAXON—Liquid formulas remove and prevent scaling and corrosion caused by hard water deposits in boilers; also check foaming and carryover in feedwater.

FLAKO—Dry formula . . . in fine granules or powdered form . . . does basically the same job as Braxon in boilers. Flako also available with anti-foaming agents.

KLEERFLO—Colorless, odorless, non-toxic liquid stops corrosion, scaling in heaters, tanks, pipes, valves, and similar equipment. Kleerflo does not restrict use of water for sanitary or industrial purposes.

ALKASTEEM—The corrosion in steam and condensate lines caused by reaction of bicarbonate decomposition and dissolved carbon dioxide in boiler feedwater is kept under control by this volatile amine. Circulates by passing from boiler with steam, returning through condensate lines.

SLUDGIT—Designed to dissolve and prevent sludge in fuel oil storage tanks. Liquid treatment removes condensation deposits, and keeps strainers, burners, pipe lines free of corrosion and operating at peak efficiency.

OX-GEM—Sodium sulphite base acts on dissolved oxygen in boiler water to produce non-corrosive sodium sulphate. Assures protection from pitting, corrosion, and accumulation of deposits elsewhere in the system.

COOLEX—Inexpensive but highly effective, formula protects metal surfaces in cooling water systems, air washers and circulating systems against scale, corrosion, and pitting damage.

RUSTEX—Pipe lines, tanks, spray heads, and other components of humidifying systems are kept free of corrosion and scale by this colorless, tasteless formula. Harmless to personnel, it is introduced into system by proportioning pump, or other convenient method.

Write today and request an analysis and recommendation on your plant's water treatment by an Anderson service engineer. There is no cost or obligation to you.

SPECIALISTS IN MAKING WATER BEHAVE

Anderson Chemical Company, INC.
Macon, Ga., Box 1424 • Phone Sherwood 5-0466
Memphis, Tenn.: Box 2432, DeSoto Station • Phone: BRoadway 2-2806
Dallas 7, Texas: Box 10444, Industrial Station • Phone: RIverside 8-7080

MARLEY is important in every picture of

PROGRESS, U.S.A.

Dynamic growth areas demand power . . . and economical conservation of cooling water in volume. At Agua Fria Station of Salt River Project, Phoenix, Arizona, Units Nos. 1 and 2 for five years have proved the practicality of big per cell capacity cooling towers teamed with big capacity turbines. A Marley Class 600 Double-Flow was recently supplied to furnish condensing water for the 168-mw Unit No. 3. It is the largest machine served by a single-structure cooling tower and, says T. M. Morong, Chief Engineer, "Tests indicate it is contributing to our having a plant that more than meets design criteria." It also contributes economy in required plant area, piping cost and maintenance.

THE MARLEY COMPANY • KANSAS CITY, MISSOURI

Babbitt

Adjustable

SPROCKET RIM

with Chain Guide

Changes that Danger Zone to a

SAFETY ZONE

— saves you money

ON EVERY VALVE

Every minute saved is money in your pocket. Cut out the waste of time, labor, floor space due to hard-to-reach valves. At the same time, convert Danger Zones to Safety Zones. Equip every overhead valve in your plant with Babbitt Adjustable Sprocket Rims with Chain Guides for day to day economy.

- They simplify pipe layout.
- They fit any size valve wheel.
- They are easy to install and operate.
- They operate any valve from the floor.
- They save time and money.
- The first cost is the only cost (no maintenance).
- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
- A hot-galvanized rust proof chain is available for all sizes.

Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. Just phone your mill supply salesman, or contact us direct.

Babbitt

168-9

STEAM SPECIALTY CO.

3 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

News of the South-Southwest

(Continued from Page 17)

J. W. Thompson | Seth M. Snyder | J. E. Roberson

Babcock & Wilcox Personnel Changes

Four personnel changes in the sales department of the **Babcock & Wilcox Company's** Boiler division have been announced by John G. Martin, manager of domestic sales.

Seth M. Snyder has been named Pittsburgh district sales manager to succeed W. I. Collins, who retired September 1 after 35 years of service with the company.

J. W. Thompson became district sales manager in Charlotte, N. C., succeeding Mr. Snyder.

J. E. Roberson moved from the Atlanta, Ga., sales office to replace Mr. Thompson as sales engineer in Cincinnati.

Mr. Snyder joined B&W following his graduation from Ohio State University in 1936. Mr. Thompson has been with the company since 1942, and Mr. Roberson since 1951. Graduates of Georgia Institute of Technology, Messrs. Collins, Thompson, and Roberson represent classes of 1918, 1942 and 1951, respectively.

Georgia Power Co. Names New Plant

The new steam-electric plant being built by the **Georgia Power Company** on Lake Sinclair in Putnam County will be named in honor of Harllee Branch, Jr., a director and a former president of the company and now president of The Southern Company.

Mr. Branch served as president of the company from 1951 to 1957. Earlier he served Georgia Power Company as vice-president and general manager.

Before joining the Georgia Power Company in 1949, he was for 18 years a member of the law firm of MacDougald, Troutman, Sams and Branch, general counsel for the company. A native of Atlanta, Mr. Branch holds the bachelor of arts degree from Davidson College, and a bachelor of laws degree from Emory University.

Mr. Branch has been president of The Southern Company since Jan. 1, 1957, and he has been a director since May, 1953. He is also a director and vice-president of Alabama, Georgia, Gulf and Mississippi power companies.

Solid Fuel Conference — Birmingham, Alabama

Many of the accomplishments and problems of the United States coal industry, from both technical and economic standpoints, will furnish the themes of the **24th Annual Joint Solid Fuels Conference** to be held Oct. 5-7 in the Dinkler-Tutwiler Hotel, Birmingham, Ala.

The event is sponsored by the Coal Division of the Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers and by the Fuels Division of The American Society of Mechanical Engineers.

The Conference will be preceded by a two-day meeting of the Southern Research Institute on various phases of "Future Coal Markets." Reservations assure the attendance of many national leaders of the coal industry for both programs.

Henry J. Hager, of Birmingham, Vice-President, Mining Operations, Alabama By-Products Corp., is Program Chairman. James A. Hagy, of Birmingham, Manager, Coal Mines, Alabama Power Co., is Conference Chairman.

W. D. Taulman — Charlotte

W. D. Taulman & Associates of Atlanta, Charlotte, Jacksonville and Birmingham, recently announced that A. R. White, Jr., has joined their firm. Mr. White is located at the Charlotte Office with Wiley T. Baker, serving the Carolinas as manufacturers' representative for water, sewage, power and industrial plant equipment.

Previously, Mr. White was with Robert & Company Associates of Atlanta, as a design engineer. He is a graduate of Duke University and Georgia Institute of Technology, and has taught at both. Mr. White is active in a number of engineering societies.

T. C. Heyward — Atlanta

T. C. Heyward & Co. of Charlotte, N. C. and Jacksonville, Fla., announces the opening of an office at 3330 Peachtree Road, N. E., Atlanta 5, Georgia.

The new office is headed by G. Cecil Walker. Telephone number is 237-0309.

Hydrocarbon Announces Texas Chemical Plant

Hydrocarbon Research, Inc., of New York City, announces the building of a 730 ton-per-day oxygen plant to produce and supply oxygen and high-purity nitrogen to Tenneco Chemical Co., Houston, for its new petro-chemical complex at Pasadena. Texas. Cost is estimated at $6.5 million.

The plant will be owned and operated by Hydrocarbon and will sell oxygen and nitrogen products to Tenneco under a long-term contract.

Hydrocarbon will also sell high-purity oxygen and liquid nitrogen for industrial distribution in the ship channel area.

Metal Show Preview

A 12-page brochure gives advance information on technical sessions and nine participating societies at the ASM Metal Show, Cobo Hall, Detroit, October 23-27. Includes return cards for advance registration and hotel reservation. Describes Materials Comparison Center, non-commercial exhibit area that presents a range of materials and components for comparison as to specific properties. Lists more than 220 exhibitors in eleven metalworking product categories. Available without charge from American Society for Metals, Metals Park, Ohio.

Largest Merchant Iron Producer in U. S. Chooses

WHIRLEX ID FANS

High Erosion Resistant Fan Wheel Assures Longer Life... Minimum Maintenance

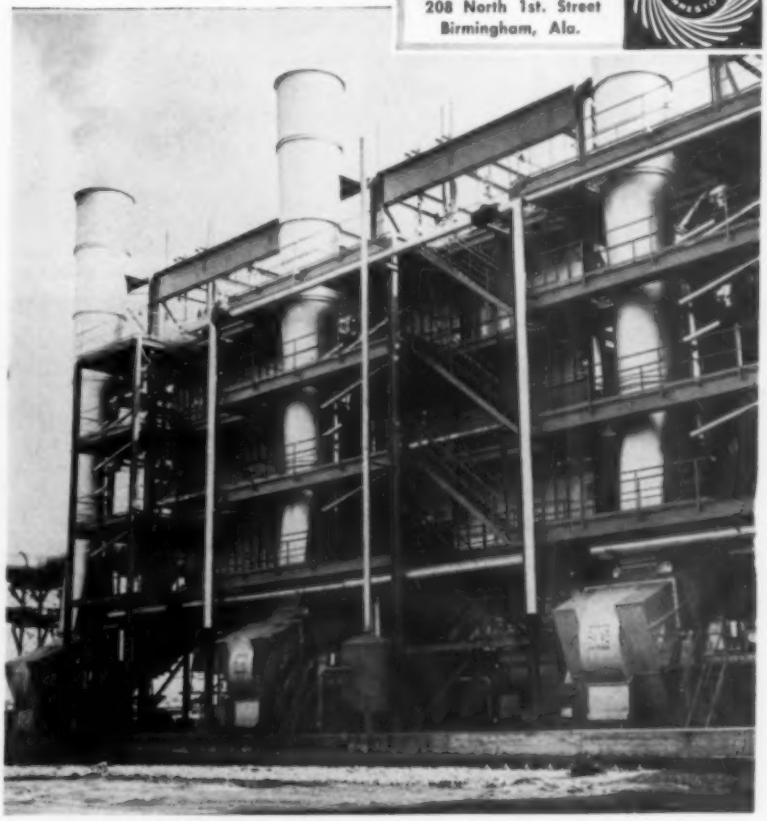
The largest furnace in the country producing merchant pig iron was recently placed in service as part of an expansion program by a major Southern mill. The new furnace has a rated capacity of 1000 tons per day and is one of the most modern in the country with respect to mechanization and automatic controls.

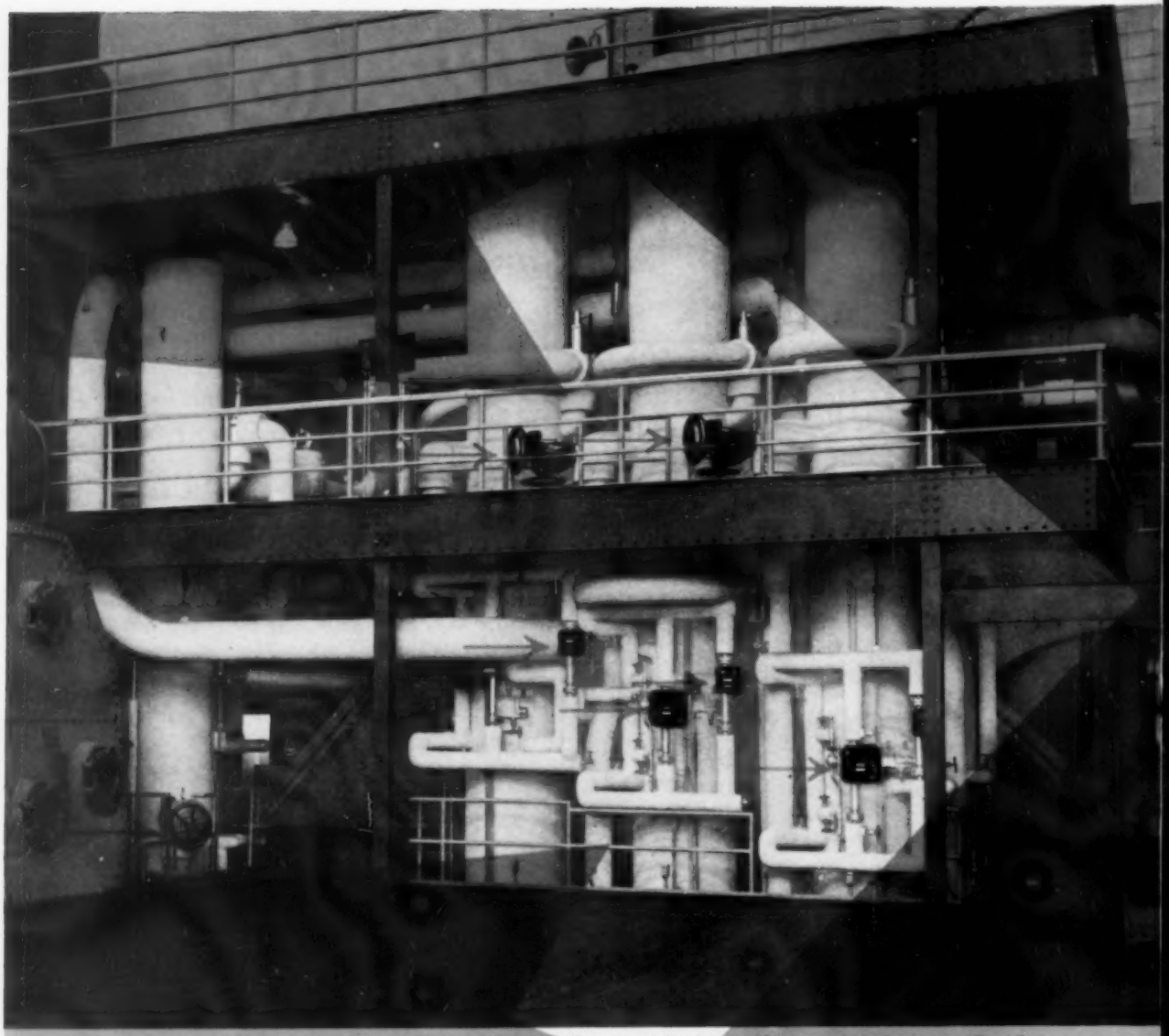
Because of their unique design and high erosive resistance, WHIRLEX heavy duty induced draft fans were chosen to handle the hot blast furnace gas. The three units shown here carry approximately 150,000 cubic feet of gas per minute. Preliminary fan examinations show wear to be less than a third that of ordinary fans designed for this purpose.

A Whirlex fan installation may solve your problem. Write or wire us.

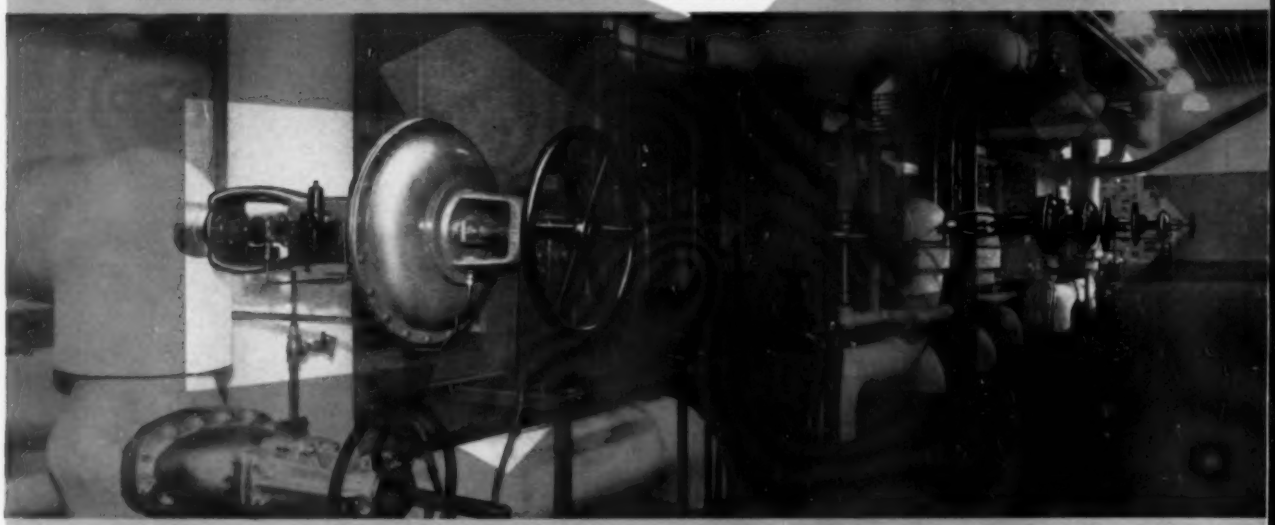
Fly Ash Arrestor Corp.
208 North 1st. Street
Birmingham, Ala.

WHIRLEX





An extensive installation of Liquid Level Controllers and Control Valves with Positioners to control condensers and low pressure heaters in a new generating station.



Masoneilan Angle Valves installed in the new power plant of a large eastern utility.

MASONEILAN CONTROLS

Help Power Plants Achieve

Design Efficiency

More and more power plants are choosing Masoneilan controls for feed water recirculating, desuperheating, condenser and deaerator level control, heater drains, reducing stations, blow-down, fuel regulation and other services important to attaining and maintaining design efficiency.

The wide variety and versatility exemplified by the Masoneilan line of transmitters, controllers, control valves and regulators permits selection of the correct equipment for optimum control, with maximum economy measured in long-term dependability and low maintenance requirements.

If you are concerned with the selection of power plant controls, it will pay you to investigate the advantages offered by Masoneilan equipment. Literature and technical cooperation are yours for the asking. Ask a Mason-Neilan representative or write.

Products that Work for Your Profit

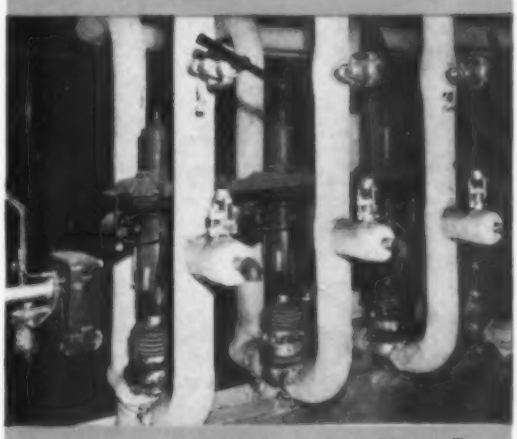
MASON-NEILAN

Division of Worthington Corporation
35 NAHATAN STREET, NORWOOD, MASS., U.S.A.
Sales Offices or Distributors in Principal Cities in United States and Abroad
In Canada: Worthington (Canada) Ltd., Mason-Neilan Division

MN1-13

Masoneilan Model 777 Angle Valve, with extended outlet acting as nozzle liner, used as a drain bypass control valve.

Masoneilan Three-Way and 10,000 Series Valves used on gas firing and ignition stop service.



A bank of Masoneilan 20,000 Series Control Valves used for controlling continuous drum blowdown.

C&EC Co.

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STANDARD ITEMS FROM STOCK!

Whatever your needs in bulk materials handling equipment, you'll find it in the Continental Conveyor line. Pulleys, Bearings, Take-Ups, Drives, Trippers, Feeders, Hold-Backs.

Call on your
CONTINENTAL CONVEYOR MAN

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Formerly Industrial Division, Continental Gin Co.

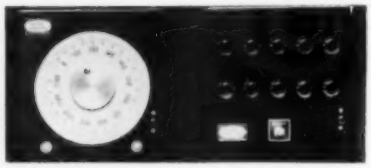
NEW Product Briefs

. . . there is always a BETTER WAY

Electronic Monitor

J-1 A new Thermo Electronic Economy Monitor has been developed by **Thermo Electric Co., Inc.**, Saddle Brook, N. J., to provide accurate, sensitive, low-cost monitoring of from one to ten points, to be checked for the same value.

Applications include monitoring temperature, pressure, speed, pH, flow, or any process variables measurable by transducers generating d-c



millivolt outputs, or changes in resistance.

The instrument is available with a null balance potentiometer or bridge type measuring circuit and a ten point scanning mechanism. Each point to be monitored is scanned in sequence and its value compared to a preestablished set-point. Scanning speeds available are from 1-10 seconds per point, to suit individual requirements. Ten red lights on the face of the instrument indicate scanning position. High or low deviation from set-point at any of the monitored points will cause the monitor to give a visual indication of malfunction, and shut down the process or processes involved.

Auxiliary audible alarms can be used with the system. Ranges are available for all standard sensing elements. Standardization of the instrument is continuous by means of the Thermo Electronic Constant Voltage Supply.

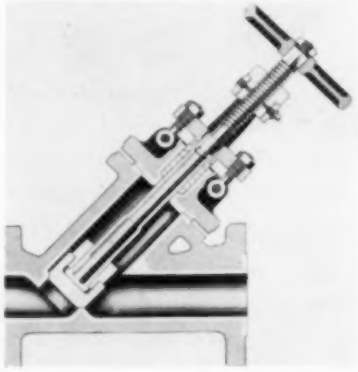
Portable Air Drills

J-2 A new line of powerful and compact air drills in straight and offset models has been introduced by **Thomas C. Wilson, Inc.**, 22-11 44th Ave., Long Island City 1, N. Y. Series 94 drills have a drilling capacity up to 5/16

in. and a choice of eight speeds for efficient drilling of a wide range of materials including steel, cast iron, non-ferrous metals, and plastics.

Plastic Lined Valve

J-3 **The Wm. Powell Company**, 2503-31 Spring Grove Ave., Cincinnati 22, Ohio, has announced a new valve, especially designed to combat destructive effects when controlling the flow of



corrosive fluids. It is a metal, plastic-lined "Y" type valve — metal for safety, strength and long life; plastic lining to assure purity of end product.

All wetted or inner parts and surfaces (inside surface of body and bonnet, stuffing box and stem) are protected by a heavy lining. Three plastic materials are available, the most feasible one to use being determined by the service for which the valve is required, as well as the

pressure and temperature of the corrosive fluid to be handled.

While these valves usually are cast carbon steel, they can be supplied in other alloys on special order. They are presently made in sizes from 1" through 3", with dimensions conforming to ASA Standard B16.5 for 150 psi.

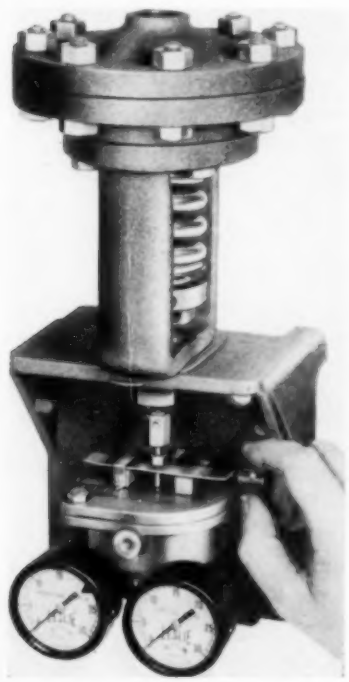
KEEP UP-TO-DATE USE SPI READER SERVICE

See Pages 65 & 66

Pressure Controllers

J-4 A new pressure controller with adjustable proportional band has been developed by **Leslie Co.**, Lyndhurst, New Jersey.

The easy matching of the proportional band controller to the response required in a particular pressure control system overcomes cycling and unstable control tendencies caused by time lags and system inertia. In addition, the controllers can be used in corrosive service or corrosive atmospheres, and for applications where non-sparking control equipment is required.



Ipco Service will keep it clean!

The boiler shown above was cleaned by Ipco Laboratories, and serves one of the South's largest railroads.

Ipco maintenance service will continue to keep it clean so that scale build-up will not recur . . .

Call CEdar 3-4162, Atlanta, Georgia, collect

IPCO PRODUCTS LABORATORIES, Inc.
2710 APPLE VALLEY ROAD
ATLANTA 19, GEORGIA
Member of Associated Laboratories, Inc.

Coming in DECEMBER Southern Power & Industry THERMAL INSULATION

Reference Guide and Buyer's Directory for the South-Southwest

Reference Guide and Buyers' Directory (included in SPI's regular December '61 Edition) will feature:

NEW PRODUCT BRIEFS & BULLETINS — sheets & fiber . . . blocks & boards . . . magnesia & asbestos . . . cork, felt & wool . . . silica & mica . . . cements & adhesives . . . jackets & coatings

SALES ENGINEERS serving you in The Industrial South-Southwest — Directory type listings including name, address and phone number.

This is SPI's annual technical service aid in the Thermal Insulation field for 1961 — a real service to you and 17,500 other Consulting-Operating-Maintenance personnel in over 12,300 plants in The Industrial South-Southwest.

POWELL MAKES IT A SIMPLE MATTER

To find the right valve for power plant installation, just call Powell. It's that simple, since Powell can supply just about any type of valve you may need to control water, oil, gas, air, steam or corrosive fluids.

What's more, you don't have to wonder about Powell performance. It's built-in through sound engineering, development, materials and workmanship . . . and proved day in, day out.

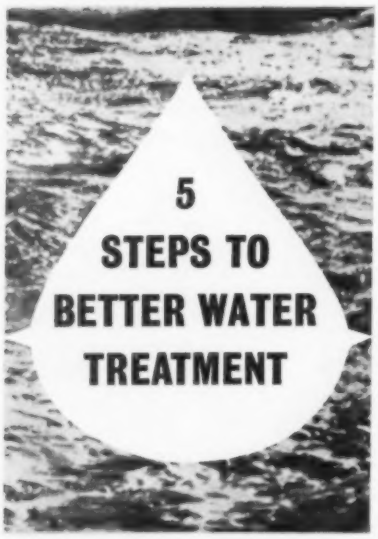
So, remember, finding the right valve can be a simple matter when you specify Powell. For further information, call your nearby Powell Valve Distributor (there's one in every major city), or write us direct.

115th year of manufacturing industrial valves for the free world

POWELL HIGH PRESSURE **VALVES**

THE WM. POWELL COMPANY CINCINNATI 22, OHIO

YOU, IONAC AND



How much should you pay to prevent scale? Corrosion? Foaming? Other water-caused problems in your steam-generating and cooling water equipment?

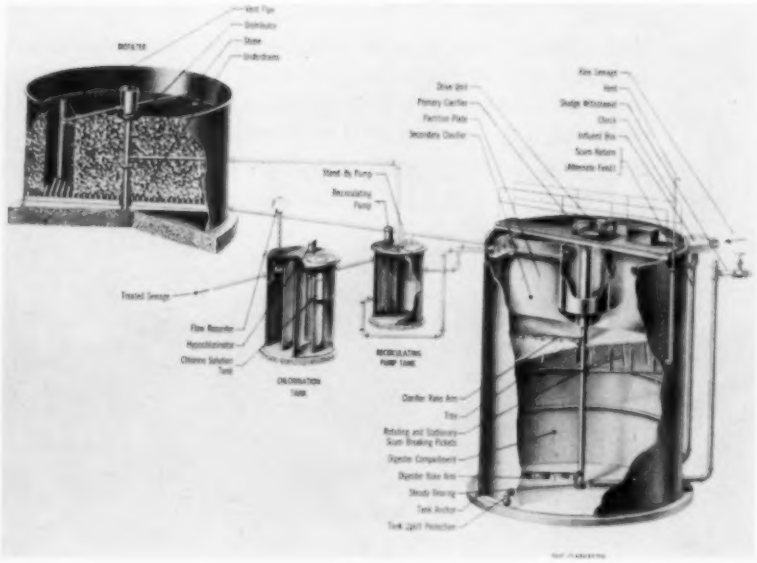
Now you can get the answers you need to do these jobs at lowest cost, through the comprehensive water treatment program available from Ionac.

This program has five steps: (1) Water Analysis, (2) Plant Survey, (3) Recommendations, (4) Periodic Supervision, (5) Continuous Control. Any part, or the entire program, can be administered for you by Ionac, a division of Pfaudler Permutit – the only company that makes both the chemicals *and* the equipment for water treatment. **You, Ionac and . . .** This integrated program is an example of the partnership between you and Ionac, in solving fluid treatment problems. Wherever there is a chance to raise efficiency or lower your costs, it takes only a call or letter from you to focus our specialized experience and facilities on your problem.

For details on the Ionac Water Treatment Program, write: Chemical Service Dept., Ionac Chemical Company, Dept. SPI-91, Birmingham, N. J.

IONAC
CHEMICAL COMPANY
DIVISION OF PFAUDLER PERMUTIT INC.

New Product Briefs (Continued)



Compact Sewage Treatment

J-5 A new series of compact sewage treatment plants is now offered by **Dorr-Oliver Incorporated,** Stamford, Connecticut, in a full range of six sizes for effective, low-cost treatment of employee and cafeteria wastes for industrial plants and factories.

Mechanical purification processes provide the modern alternative to septic tanks and subsurface disposal fields. The new designs utilize the well-established Biofiltration process.

The degree of treatment provided, including chlorination, permits safe disposal of the effluent in a nearby water course or body of water. Features such as the high recirculation rate and separate sludge digestion and storage permit these plants to handle varying flows and varying strengths of sewage automatically, without constant attention and adjustments.

Standard designs, based on a 24-hour run-off, cover a range of 10,000 to 180,000 gallons per day. State board of health regulations determine per capita requirements. Run-off periods are normally estimated on a per-shift basis, and the maximum requirements of any one shift determine the total capacity.

Factory fabrication, all-steel tank construction and simplified piping reduce installation costs. Smaller sizes are shipped shop-assembled while larger sizes are available field erected by Dorr-Oliver crews.

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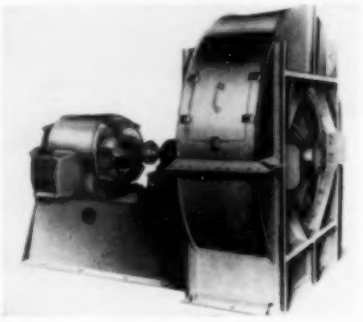
See Pages 65 & 66

Industrial Centrifugal Fan

J-6 A new series of heavy-duty industrial fans (Series 8500) has been announced by the **Sturtevant** division of **Westinghouse Electric Corporation,** Hyde Park, Mass. Featuring the use of airfoil blading, the new centrifugal fans are tailored specifically for high efficiency at direct-connected motor speeds. The units are ideally suited for applications such as: combustion air for steel mill and industrial furnaces; packaged steam boilers; and for industrial processes such as glass

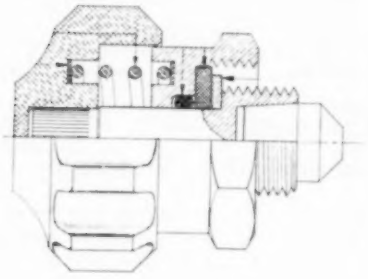


cooling, vacuum drying and exhaust from aluminum pot lines.

The Series 8500 fans are consistent with an industrial trend to direct-drive-type machinery because of its reliability in continuous operation. Direct drive also extends application possibilities where fan speeds or horsepower input exceed belt drive limitations. The new fans bring the efficient and quiet performance of airfoil blading to the direct-connected motor and turbine class of fan.

Welding Torch Valve

J-7 **The Harris Calorific Company,** 5501 Cass Ave., Cleveland 2, Ohio, announces its newly-designed V-43 Valve as standard equipment for the Harris No. 43 welding torch. A product



known as Nylatron provides positive shut-off with minimum effort on the large capacity valve openings. Continuous spring tension on the valve stem assembly makes the adjustment of flames on small tips easy and assures constant flame setting.

"O" ring seal packing is used for longer life, replacing leather-type packings. The valve knob is internally supported to prevent bending of the valve assembly by rough treatment.

Sprocket with Shear Pin

J-8 **Browning Manufacturing Company,** Maysville, Kentucky, has introduced shear pin sprockets with shear pin hubs and split taper bushings. The three basic parts are steel sprocket, malleable hub assembly, and malleable bushing.

The Shear Pin Sprockets are designed to prevent damage to expensive machinery due to overloading or jamming by shearing the necked pin at a predetermined load. The inner part of the hub is keyed to the shaft and remains stationary while the outer part, to which the sprocket

Take the legwork out of liquid measurement

Here's practical liquid measuring—the modern way... without roaming all over the lot! Liquidometer Gauges let you inventory distantly stored liquids at a glance.

Completely automatic Liquidometer Gauges can be located as far as 250 feet from tanks. Think what this centralized system can mean in man-hours saved—let alone the additional safety of personnel who no longer have to trudge to, or tamper with, hard-to-get-at tanks.

Simple to install, and requiring no maintenance, Liquidometer Gauges measure virtually all liquids conveniently, continuously, and correctly. There's a type available for practically every liquid measuring application.

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A DISCUSSION OF

COUNTERFLOW*

REGENERATION

THIS PATENTED METHOD PROVIDES MORE EFFICIENT OPERATION OF ION-EXCHANGE EQUIPMENT.

Conventionally, in ion-exchange equipment used for chemical processes, the resin bed is exhausted, or "loaded," by a downward flow of liquid and then regenerated, or "stripped," by a *downward* flow of acid or alkali.

As a result, the lower part of the resin bed is inadequately regenerated, unless a great excess of regenerant is used. Then, during the service cycle, the impurities thus left near the bottom of the resin bed will be leached off into the product. Or, if the resin is used to pick up valuable materials, an incomplete separation will occur. The logical solution would be *up-flow* regeneration, but normally, due to the low density of ion-exchange resins, the bed would rise or expand and there would be insufficient contact of regenerant. With COUNTERFLOW*, however, Illinois Water Treatment Company has achieved successful *up-flow* regeneration by introducing a "barrier" to prevent bed expansion. For example, one method is to introduce water at the top and regenerant at the bottom, drawing both off just above the resin bed.

Substantial improvements result from COUNTERFLOW* — resin capacity increased as much as 25%, leakage of impurities reduced as much as 75%. Where the resin is used to pick up valuable materials, COUNTERFLOW* "stripping" gives more complete separation without increased dilution.

*COUNTERFLOW *is the trademark of Illinois Water Treatment Company equipment utilizing an up-flow method of regeneration with a "barrier" to keep the bed from expanding. U.S. Patent No. 2,891,007.*

For detailed information, address:

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

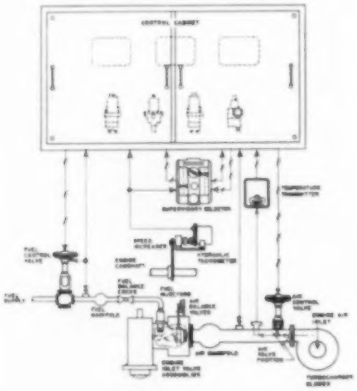
New Products (Contd.)

is bolted, rotates freely after pin breakage, allowing the drive to idle. The hubs are made of malleable iron, accurately machined and lubricated for frictionless rotation in the event of pin shear. A steel safety collar with setscrews holds the assembly together.

The Shear Pin Hubs are primarily designed for sprockets, but can be used with special sheaves, gears, clutches, etc., to provide shear pin protection for almost every type of drive.

Gas Engine Control

J-9 A new automatic computer system that controls speed and fuel-air mixture of gas engines is now available from **Bailey Meter Company,** 1050 Ivanhoe Rd., Cleveland 10, Ohio. Included in the



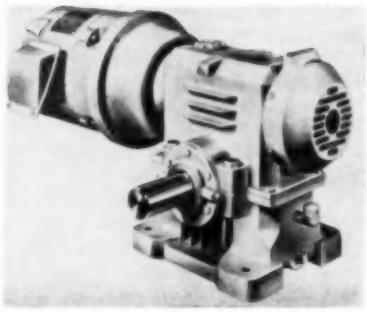
system are a supervisory panel, a speed control network, and a pneumatic computer mixture control network.

A "Mini-Line" Selector Station mounted on the engine panel permits the operator to establish the running speed and the fuel-air mixture. The Bailey Control System then automatically regulates the fuel and air supply to maintain these parameters.

Motorized Speed Reducer

J-10 Involute helicoid thread form is featured in motorized worm gear speed reducers recently added to the product line of **De Laval-Holroyd, Inc.,** 121 First Ave., Trenton 2, N. J.

Eight sizes for motors from one to 20 hp, with center distances from 2½ to 8 in., and speed ratios of 5:1 to 70:1 and higher, are offered with



single or double-extended gear shafts.

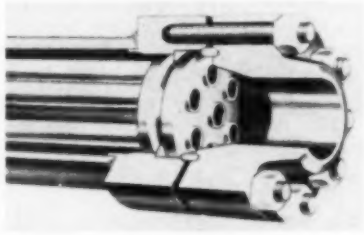
Motors are readily attached to or detached from a flange on the gear case. Motor and worm shafts are connected by couplings which require no lubrication.

The involute helicoid thread form has the highest load capacity of any type of worm gear. Gearing is generated to produce leaving-side contact which provides the ideal condition of an entering-side gap for lubricant.

Multi-Fintube Exchanger

J-11 A new heat exchanger developed by **Brown Fintube Company,** 300 Huron St., Elyria, Ohio, incorporates a bundle of fintubes into a high pressure, hairpin type shell. The exchanger is suited for high pressure operations up to 6000 psig in the tubes and 1800 psig in the shells.

The advantages of using a bundle of fintubes over the conventional



single tube in a double pipe exchanger is that it increases capacity substantially, which reduces the cost of sizing many jobs. One multi-fintube unit with its higher heat transfer capacity can replace as many as four conventional units. This increased pressure rating for the tube-side and shellside opens the door to many new high capacity uses for hairpin type exchangers, formerly considered impractical or uneconomical due to the number of double pipe sections required.

Stud Driver Fastening

J-12 **Sileps, Inc.,** 1501 N. Davidson St., Charlotte 3, N. C., is offering the Fixrammer Model Control-A-Stud, which incorporates new safety features for driving studs into concrete and steel.

Power is transmitted directly to a plunger which is then moved at a relatively slow speed, thus actually pushing the stud into the material. The stud automatically stops when the plunger discontinues pushing it.

Breakage of concrete around the stud (spall) is also eliminated.

Since powder marks have been eliminated through a special gas control chamber, "Control-A-Stud" may also be used on finished (inside) surfaces. It can be used for driving studs into hard concrete, thick steel, soft cinder blocks or inconsistent masonry, with a special powder charge. Automatic control system regulates the depth of penetration and stops the stud from coming through the opposite side.

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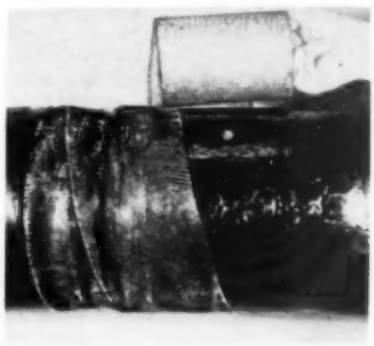
Called Dowpac 20A, the new material consists basically of individual sheets, corrugated in two directions, measuring approximately 36" x 21". A unique self-spacing design permits the sheets to be assembled side by side to form a cubic module for erecting an aerating tower of appropriate size.

The special configuration of the sheets is designed (1) to distribute falling liquid wastes in thin films over large surface areas so that maximum aeration efficiency is obtained; (2) to provide a high percentage of void space for unimpeded natural-draft ventilation and waste.

Underground Piping Field Connections

J-14 **Ric-wiL. Incorporated,** Barberton, Ohio, announces a new underground piping field closure material called Rip-Coat.



Rip-Coat is a mastic collodial resin that is highly resistant to moisture, weathering, acids, alkalies, and electrolysis. It is unaffected by temperatures ranging from sub-zero to 250 F. The coating can withstand severe distortion and bending.

In the field, Rip-Coat is brushed on over the welded conduit joint and then a glas-wrap material is applied over the Rip-Coat (see illustration). A final coating of Rip-Coat is then applied over the wrap material to complete the closure.

Rotary Impact Drill

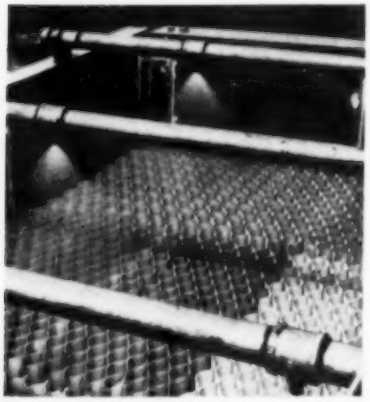
J-15 Designed to eliminate costly, time-consuming "set-ups" and the moving of heavy equipment (compressor, water tank, etc.), to the job to drill holes in

concrete, a new rotary impact drill is now being released by the Tool Division, **Bill Jack Scientific Instrument Co.,** Solana Beach, Calif.

Rotating at 1200 rpm and delivering 7,200 impacts per minute at the core drill bit tip, the ROTO-IMP shatters both gravel particles and rock aggregates as it cuts holes from 1⅛" to 6" in diameter.

Plastic Filter Packing

J-13 A new plastic packing for efficient and economical treatment of water-borne wastes in trickling filter applications is now being produced and marketed by **Dow Industrial Service,** 20575 Center Ridge Road, Cleveland 16, Ohio, a division of the Dow Chemical Company.



Panel Instruments

J-16 **Daystrom, Incorporated,** Weston Instruments Division, Newark, N. J., has broadened the Weston 1900 Series of rectangular a-c and d-c meters with new 3½-inch instruments, designated Model 1931.

As with the existing 4½, 5½, and 7½ inch meters, the new instruments are available as ammeters, milliammeters, microammeters, and voltmeters, with optional 1 per cent or 2 per cent accuracy. Instruments of 1 per cent accuracy feature a knife-edge pointer and mirror scale; models of 2 per cent accuracy are equipped with a lance type pointer and conventional scale. Front covers are available in either clear plastic or Bakelite. Uniformity of design for the entire line provides an overall harmonious appearance when instruments of various sizes are mounted on a common panel.

Mechanisms have been designed for maximum simplicity and are available in three types.

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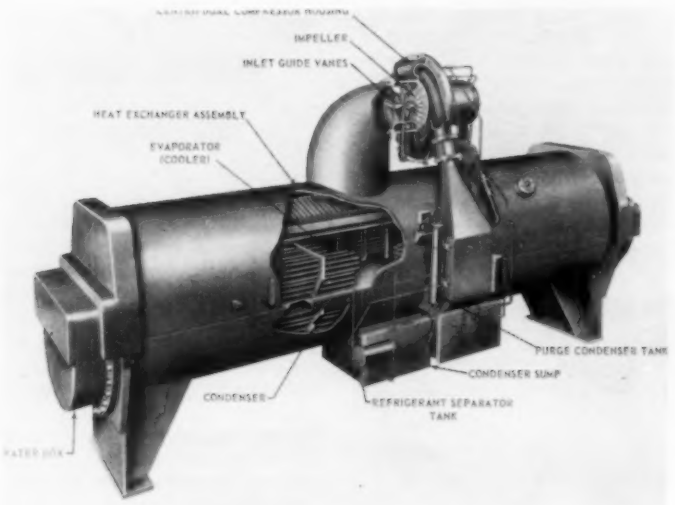


Packaged Refrigeration

J-17 The trend to compacts has now invaded the air conditioning and refrigeration field. A new hermetic centrifugal refrigeration machine that is half as big and half as heavy as any conventional centrifugal unit has been developed by **American-Standard Industrial Division,** Detroit 22, Mich. The equipment, called the Packaged Tonrac, provides chilled water for operating zone or room-type air conditioners from a central station.

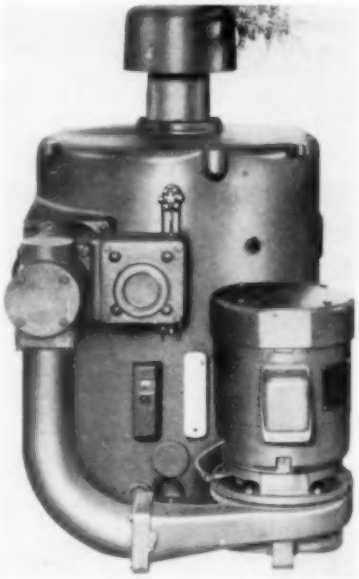
Its major significance to industry lies in the fact that this is a centrifugal type machine which occupies less space, which requires less costly building structures to support it, which is less costly to handle during installation and which eliminates field assembly and on-the-job hookup of auxiliary water piping, refrigerant piping and control tubing.

The Packaged Tonrac is small enough to pass through a standard 36-in. wide commercial doorway. It is available in eight sizes from 50- to 100-ton refrigeration capacity. A liquid-refrigerant-cooled electric motor drives the refrigerant compressor at 18,000 rpm.

Vacuum Pump

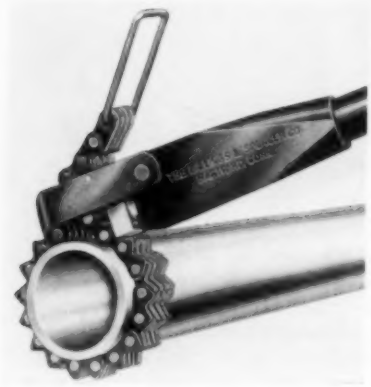
J-18 **Domestic Pump & Manufacturing Corp.,** Shippensburg, Pa., has introduced the "Centrivac" vacuum pump to meet the requirements of a wide range of industrial, process, and testing applications. The unit is especially practical where hot gases, condensable vapors or even slugs of liquid are present in air handled. It can be used as a combination air pump and direct-contact condenser, as a liquid scavenger, as a combination vacuum-condenser-pressure unit.

The multi-jet vacuum producer has no moving parts, requires no internal lubrication or wear adjustment. Nonpulsating suction is maintained without accumulator or equalizing tanks. Vertical pump design protects motors from surface water and dirt —saves floor space. The operation is inherently quiet, requiring no silencers. It is available as a package unit.



Chain Strap Wrench

J-19 A new wrench that combines the strength of a chain wrench with the smoothness of a strap wrench is being introduced by **The Billings & Spencer Company** of Hartford, Conn.



The design of the links and their arrangement in the chain give the Billings No. 93 its holding strength and its smooth, gentle grip.

It is safely used on soft and thin materials in assembling, adjusting or removing plastic, brass or copper pipe, chrome plated tubing, electrical conduit, tar-coated pipe and close nipples (on threads).

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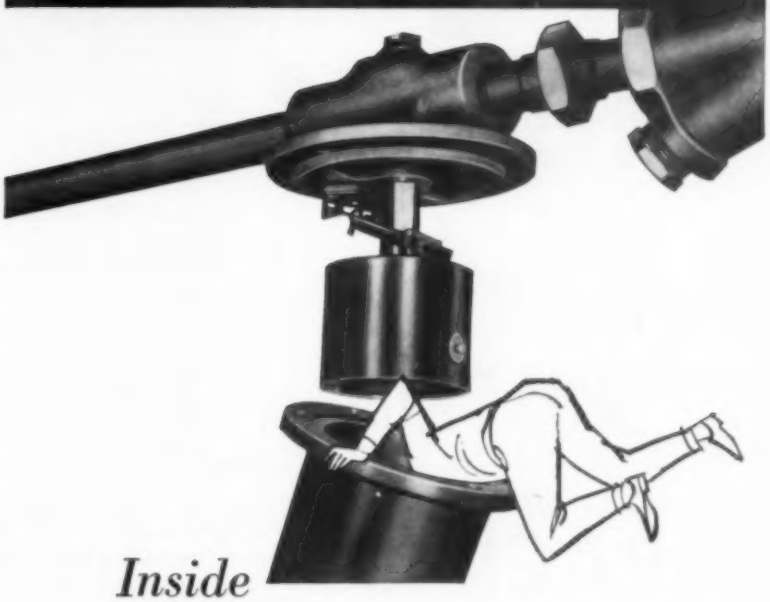
Metal-Tube Flow Meters

J-20 **Wallace & Tiernan Inc.,** 25 Main Street, Belleville 9, N. J., announces a line of metal-tube variable area flow meters to complement its glass-tube Vareameter.

The Metal-tube Verea-meters are used at temperature and pressures beyond the range of the glass-tube type and for handling hazardous materials. They are supplied with ASA 150 and 300 lb flanges and conform to ISA Recommended Practices. Meters are supplied in a variety of materials to handle a wide range of industrial chemicals.

Tube diameters are from ½-inch to 3 inches. Water capacities range from one to 400 gpm and air capacities from 4.2 to 1680 scfm.

in any steam trap...
IT'S WHAT'S INSIDE THAT COUNTS

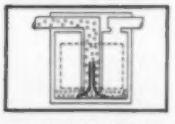


Inside
SUPER-SILVERTOPS

GUIDED BUCKET—Inverted bucket is guided on patented center tube. Results in perfect alignment—no damage to internal parts. Guarantees positive leakproof seating of valve.

NO RESTRICTED PASSAGES—Passages are short, liberal size, clean and smooth bore. Cannot clog with foreign matter. Assure full operating efficiency for trap life.

ANDERLOY VALVE AND SEAT—Eliminates erosive effect of steam. Held in place with clamp and stainless steel screws. Easily removed.



REVERSE FLOW—Bucket remains stationary and the valve open, even during heavy load periods. Stirs up sediment—keeps trap clean.

QUALITY ENGINEERING—The above features of Super-Silvertop Steam Traps are indicative of the outstanding engineering principles employed in the manufacture of all Anderson Steam Specialty products.

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types DS and DL

Double Volute

Double Suction

single stage centrifugal pumps

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Inc. . . A Division of Dresser Industries, Inc.

HUNTINGTON PARK, CALIFORNIA, U.S.A.

1 NEW QUALITY – All DS and DL pumps are skillfully moulded from meticulously fabricated patterns to provide smooth exterior and interior contours and controlled case thicknesses. All parts in contact with liquid being pumped may be fabricated from any commercially available ferrous or non-ferrous metal.

2 NEW DESIGN – Types DS and DL are *double volute* with double suction impeller. Shaft assemblies are dynamically balanced, radially and axially for minimum wear. Cases are axially split with nozzles cast integral with lower half. Type DS has provisions for water cooled packing boxes and bearings. Type DL is air cooled. Available with conventional packing or mechanical seals. Internal assemblies are mounted on only six shaft size groups for maximum parts interchangeability between pump sizes.

3 NEW PERFORMANCE – With a capacity range from 2,000 to 13,000 GPM and differential heads to 375 ft., the 22 sizes of type DS and the 13 sizes of type DL, make it unnecessary to compromise your specific pumping requirements – i. e., optimum efficiency with low NSPH.

4 NEW ECONOMY – Pacific types DS and DL pumps offer threefold economy. First, engineering skill and expert craftsmanship reduce the initial cost appreciably. Second, the balanced hydraulic design results in minimum wear on moving parts insuring higher sustained efficiency. Third, rapid disassembly plus maximum spare parts interchangeability between pump sizes assures reduced maintenance costs – less down time.

PACIFIC

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CHEMICAL UTILITY & GENERAL INDUSTRIES
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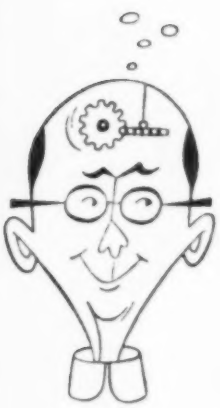

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MAINTENANCE—TOOLS EQUIPMENT & METHODS

1—Emergency Chemical Cleaning — 4 page catalog highlights Anco solvents and service trucks available to remove scale, rust and other deposits from all types of heat exchange equipment. — ANDERSON CHEMICAL COMPANY.

8—Ceramic Coatings — Chempro sprayed ceramic coatings to resist abrasion, erosion and corrosion described in Bulletin CP-28. Ideal for shaft, shaft sleeves, impellers, valves, cams. — CHEMICAL & POWER PRODUCTS, INC.

11—Rust Preventives — Selection factors for proper NO-OX-ID rust preventives for maintenance application featured in Bulletin 3200. Covers type of coating, product, recommended uses, physical characteristics, method of application, and coverage. — DEARBORN CHEMICAL COMPANY.

14—Hose & Fitting Needs—Complete Weatherhead line described in bulletins — flared, flareless or pipe fittings; brass, stainless, carbon; pressures to 10,000 psi; sizes ⅛" to 2" O.D.; production or small maintenance quantities. — DIESEL INJECTION SALES & SERVICE.

16—Epoxy Coatings — Form 1014 describes advantages of epoxy coatings for highest resistance to chemicals, wide variety of uses, flexibility and adhesion, and abrasion resistance. — Valdura Paint Division, AMERICAN-MARIETTA COMPANY.

26—Temperature-Millivolt Measurement — Take accurate measurements wherever you go — laboratory, plant or field — with the compact 3½ lb MiniMite null-balance potentiometer pyrometer. Range scales can measure temperatures from minus 450 F to plus 3200 F. Use it for standard checking and calibrating procedures. Automatic cold-junction compensation is built-in.—THERMO ELECTRIC CO., INC.

27—Corrosion Control Systems — Brochure 9111 outlines five-step procedure for primary protection and preventive maintenance of all metal surfaces subject to acids, alkalis, solvents, fumes and gases.—TRUSCON LABORATORIES.

50—Industrial Weed Problems? — Any man can weed-proof 10,000 sq ft in ten minutes with Ureabor — the dry granular weed-killer. You only use 1 to 2 lb per 100 sq ft. Folders give details on long-lasting control and your nearest distributor. — UNITED STATES BORAX & CHEMICAL CORP.

51—CHIMNEY PROTECTION—New non-asphaltic, spray applied coating for use in concrete, steel, and brick chimneys inhibits corrosion from acid exhaust gases. Customer field tests rate STACKFAS outstanding on heat, acid and fly ash abrasion resistance — BENJAMIN FOSTER COMPANY.

54—Repair & Maintenance Products — Complete product line shown in use with prices, sizes, weights, colors and styles. All products distributed by Rasco's 11 Southeastern Branches. — REYNOLDS ALUMINUM SUPPLY CO.

55—Better Tube Maintenance — Catalogs describe how line of air-powered tools and accessories (condenser cleaners, tube cutters, expanding brush head cleaners, etc.), are job-fitted to specific tube repair operations. — AIRETOOL MANUFACTURING COMPANY.

56—Paint & Resin Application — Bulletin A-101-2 describes Turbulator Gun and Bulletin A-101-3 the Formulator A for fast, efficient application of catalyzed epoxy and other coatings — both developed for spraying, pouring or foaming multiple component materials, including many new resins which preclude use of conventional spray equipment. — Plastics and Resin Equipment Div., BINKS MANUFACTURING CO.

57—Maintenance Painting — The Porter Manual makes it easy for you to do the right thing with your paint maintenance dollar. Details Planning, Surface Preparation, Application, Film Thickness, Classification of Surfaces, Abrasion Resistant and Heat Resistant Finishes and Fungus Control. — PORTER PAINT CO.

58—Tube Expander Drives — Bulletin 581 gives data on complete line of Torq-Air-Matic automatic tube expander drives and explains the importance of precision control in tube expanding. Chart to aid selecting right model for the right job. — THOMAS C. WILSON, INC.

63—Heat-Proof Coatings — 4-page Form MPC 5-460 tells you how to stop corrosion and destruction of metals with heat-proof protective coatings. — MARKAL COMPANY.

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72—Vinyl Spray — Bulletin describes the Aerosol vinyl spray for instant repair and protection — an air dry vinyl coating which adheres to practically any clean, dry surface. — QUELCOR, INC.

91—Heavy-Duty Paints — 1961 Valdura catalog, 32 pages, covers rust inhibitors, primers, corrosion resisting coatings, etc., for industrial use. — AMERICAN-MARIETTA COMPANY.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

100—Power Plant Pumps — Bulletin BJP 58-8 covers complete line of standard pumps for power plant requirements — from 12,000 hp, doublecase boiler feed pump to condensate, circulating and booster pumping duty. Also, special pumps for nuclear power plant installation. —BYRON JACKSON PUMPS, INC.

109—PROCESS PUMPING—Factors of best economic balance in process pumping offered by new pipe-mounted centrifugal pumps highlighted in Type SPM Bulletin 142. — PACIFIC PUMPS.

122—Industrial Fans — Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm pressures to 18" SP. Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. — CLARAGE FAN CO.

143—Chemical Feeders — 36 page Bul. 1136 describes metering pumps — types, construction, displacement and operating pressures. Gives handling recommendations for chemicals, acids, etc., and volumetric conversion tables. — MANZEL.

165—Heat Exchangers — Bulletin 120 illustrates function of new equipment to provide cooling of liquids in industrial plants. Air-

Bulletins (Cont.)

cooled heat exchanger, which is independent of large supply of cooling water, provides additional savings of installation and operation expense. — NIAGARA BLOWER COMPANY.

170—Pumping Problems? — Two stage, Type JC pump will meet requirements up to 650 gpm. Horizontally split casing top can be taken off quickly for inspection and rotating parts removed and replaced without disturbing piping, connections, fittings or driver. — THE WEINMAN PUMP MFG. CO.

INSTRUMENTS—METERS CONTROLS—REGULATORS

207—Control Centers & Systems — Combustion safeguard and automation packaged control centers insure full coordination of complete system, place responsibility on one source, insure correct wiring, and reduce field labor. Catalog C11 illustrates variety of designs and circuits now in use. — WEBSTER ENGINEERING CO.

208—Water Level Alarms—Brochure D1 — Float operated low and high water level alarms and fuel cut-offs, for low and medium pressure boilers, tanks and other vessels. — RELIANCE GAUGE COLUMN CO.

211—Butterfly Valves — Folder supplement to Catalog 307 stresses flexibility in valve line for controlling large volumes of liquids or gases. Valve actuators, special arrangements, shaft extensions, and electric actuators and positioners are featured. — MASON-NEILAN.

212—Self-Powered Controls — Bulletin 620 describes self-powered automatic temperature regulators — no compressed air or electrical wiring required, no delicate mechanisms to adjust, no packing glands to stick, no shut-down due to power failure. — SARCO COMPANY, INC.

213—Meters & Controls — Bulletin G15-1 describes and illustrates systems and instruments used in the measuring, transmitting, receiving, interpreting and controlling of 18 variables normally encountered in power plant and industrial plant operation. — BAILEY METER COMPANY.

223—Combustion Control — Bulletin 1023, 24 pages — Contains installation photos and diagrams of Bailey air operated combustion control for oil and gas fired boilers; two pages of chart records and six page list of typical installations. — BAILEY METER COMPANY.

224—Feedwater Regulator—Bulletin 1044 describes the BI Feedwater Regulator, the single-element unit employing a thermostatic-tube level controller which actuates a regulating valve in feed line. For loads from 10 to 785 psig. Includes specifications table and schematic diagram. — COPES-VULCAN DIV.

225—Cooling Controls — Self-powered controls for compressors, stills, solvent coolers, degreasers and small engines are described in Bulletin 710; operational and hook-up sketches.—SARCO COMPANY, INC.

228—Fuel Cut-Outs & Water Level Alarms — Brochure D2 — Electrode type equipment for installation on water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

235—Liquid Level Gauges—Bulletin 463A describes automatic remote reading systems for nearly any liquid. Features include easy to read dial indication. — LIQUIDOMETER CORP.

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255—Temperature Regulators — "Sliding Gate" units are simple, low - cost, self - operating, automatic control valves for heating or cooling applications. Action easily reversed by rotating seats 180°; self-powered — no electricity or compressed air needed; easy to install. Bulletin J-180-1 describes ten standard ranges from 35-450 F. — OPW-JORDAN.

267—Remote Liquid Level Indicators — Bulletin RI-1825 describes indicators for pressures up to 3000 psi — advantages, operation and specific installations.—YARNALL-WARING COMPANY.

293—Metering & Control Systems — Bulletin 500, 4 pages, discusses pneumatic and electric telemetering. Covers components making up the systems. — BAILEY METER CO.

295—Two Fuel Cut-Out Controls in One — Float operated and electrode-operated fuel cut-out functions contained in one device. Bulletin D2.5 describes convenient optional hook-up possibilities, for pressures to 350 psi. — RELIANCE GAUGE COLUMN CO.

PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

300—Buyer's Guide—Up-to-date industrial and maintenance building products stock list. Includes complete listing of all Rasco distributed products plus branch locations. — REYNOLDS ALUMINUM SUPPLY CO.

301—Vacuum Cleaning Systems — How portable and stationary systems cut costs and increase plant efficiency shown in Booklets P8 and AB-100. Eight heavy duty units (1½ to 15 hp) for cleaning hard to get at areas, reclaiming valuable materials. — Air Appliance Div. of HOFFMAN INDUSTRIES.

304—Backing Rings — Bulletin 56-2 describes rings for fast, economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING CO.

306—Steel Buildings — Shed roof, gable roof frameless and gable roof rigid frame units described in Catalog SX-13757. 5,000 sizes available to meet all space needs. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

310—Incinerator — Metal cased, insulated, refractory lined incinerators for industrial and commercial use. City smoke code approved. Fast, economical installation — any size and capacity. — NORTH STATE PYROPHYLLITE CO., INC.

315—Pressure Vessels — Catalog 100 discusses plate fabrication problems and shows how company custom-fabricates hot water storage heaters, tanks, air receivers, blow-off tanks. Corrosion resistant linings and materials featured. Suggested specifications and other valuable technical data given. — J. J. FINNIGAN CO., INC.

317—Drier Compressed Air — Bulletin 130 shows how Aero After Cooler cools compressed air or gas below temperature of surrounding atmosphere; no further condensation in air lines. Installed outdoors. Saves cooling water. Gives better operation of air-operated tools. — NIAGARA BLOWER COMPANY.

324—Painting New Plants — "Plan Painting of New Plants to Reduce Costs" describes how lead-suboxide paints can save 1 or 2 coats of paint on new plants. Eventual repainting costs are cut as well since these paints form a dense, metallic lead film which can be recoated without expensive scraping, sanding or repriming. — SUBOX INC.

326—Beam-Type Guardrail—Manual FB-3456 describes how Flex-Beam Guardrail protects danger spots along roads, highways, bridges, and in industrial plant locations. Installation photos, drawings, reference data, dimensions and physical properties. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

332—Heat Transfer Equipment — If you have material to liquefy, heat, vaporize, superheat, condense, cool or solidify, check Bulletin HE-8 describing exchangers designed for temperature as low as minus 160 F and as high as 1600 F with pressures ranging from vacuum to 9500 psi. — HENRY VOGT MACHINE CO.

335—Classifying Systems — Bulletin explains general operating characteristics of centrifugal and gravitational type classifiers. Curves illustrate high efficiencies achieved in actual installations and indicate particle size distribution of incoming feed, separated fines and coarse material. — BUELL ENGINEERING CO., INC.

342—Power Roof Ventilators — Bulletin 550 describes V-belt driven centrifugal type power roof ventilators. Pressures to 2" SP; capacities from 1500 to 26,500 cfm.—CLARAGE FAN CO.

357—Mechanical Lubricators — Various force feed mechanical lubricators, accessories, and components available for lubrication systems described in Bulletin L-60.—MANZEL.

386—Rigid Frame Buildings—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bowstring truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

BOILERS—STOKERS BURNERS—FUELS

502—Feedwater Treatment — 4 page catalog tells how Braxon and Flako internally condition water to remove and prevent scale formation and corrosion in boilers. — ANDERSON CHEMICAL COMPANY.

505—Refractories — Paco High Heat Duty and Super Duty Plastic Refractories. Fire brick, high temperature cement, castables. Installation and engineering service. Free estimates and inspection. — NORTH STATE PYROPHYLLITE CO.

515—Packaged Steam Generators — Bulletin PSG-3 describes factory assembled portable type units from 10,000 lb/hr to 48,000 lb/hr capacities. Gives construction details and dimensions. In standard pressures of 175, 250 and 375 psi. — HENRY VOGT MACHINE CO.

516—Fuel Savings — How the packaged Ljungstrom air preheater boosts performance and offers fuel savings for small boilers and process applications is highlighted in 14 page bulletin. Boiler as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels. — THE AIR PREHEATER CORPORATION.

519—Feedwater Deoxygenation — 12 page Bulletin BW-7 describes advantages of chemical deoxygenation of boiler feedwater with an aqueous solution of Hydrazine. Covers in detail the properties and action of Hydrazine in maintaining boilers as well as recommended methods of application. — FAIRMOUNT CHEMICAL CO., INC.

529—Boiler-Burner Lease Plans — New rental plan for Powermaster boilers and burner systems covers use of equipment and cost of installation without capital investment. — ORR & SEMBOWER, INC.

535—Packaged Boilers — For steam, 15-250 psi, or hot water; gas or combination oil/gas firing; factory tested; guaranteed 80% fuel-to-steam efficiency for fuel economy; quiet; four-pass forced draft design; field started. Bulletin AO 184 gives details. — CLEAVER-BROOKS COMPANY.

536—Automatic Boiler-Burner Unit — Assembled plant (Scotch-type, two-pass) for all heat or power applications, low pressure or high pressure; burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil. Easy maintenance. Bulletin SPI-100 gives details. — INDUSTRIAL COMBUSTION, INC.

537—Waste Heat Boilers — Economical utilization of excess heat from diesel exhaust gases and from industrial and chemical processes described in Bulletin WHB-47-4. Bare tube and extended surface designs of varying capacities and applications covered. — FOSTER WHEELER CORPORATION.

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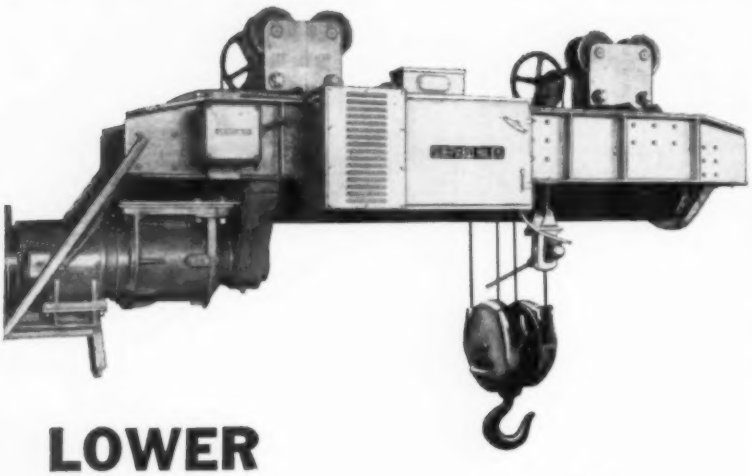

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Bulletins (Cont.)

542—Underfeed Stoker — Illustrated Cat. 401 gives complete data on double retort underfeed stoker built for heavy duty service in intermediate size range for boilers of 20,000 lb to 34,000 lb of steam/hr capacity. — DETROIT STOKER CO.

547—Gas and/or Oil Burners — Bulletin B1 describes large or small, single or dual fuel, packaged or field assembled, atmospheric or forced draft burners; electronic of all types; competent sales and service. — WEBSTER ENGINEERING CO.

551—Packaged Water Tube Boilers — Complete data and dimensions for boilers ranging from 8,000 to 50,000 lb/hr, firing oil or gas or both, described in 12 page Catalog 111-D. — SUPERIOR COMBUSTION INDUSTRIES, INC.

558—Boiler Auxiliary Package Units — Packaged system of various compact combinations of deaerating feedwater heaters, boiler feed pumps, condensate surge tanks and blow-off tanks described in Bulletin 59-1. Standard units for steam plants of 10,000 to 100,000 lb/hr capacity and pressure to 300 psig. Higher capacity units also available. — WICKES BOILER CO.

570—Seamless Boiler Tubes — 44 page Bulletin 12 contains complete description of manufacture, advantages, tolerances, allowable stress and working pressures, bursting strength, weights, steam properties and other data. — NATIONAL TUBE DIV., UNITED STATES STEEL CORP.

574—Packaged Generator — Bulletin 582 describes Vapormatic Coil-N-Shell Steam Generator for service requirements of 5 to 150 psig. Gives operation features and specifications. Available with gas, oil, and combination gas/oil fuel systems. — TEX-STEAM CORP.

587—Coal-Fired Packaged Boiler — The new semi-automatic stoker-fired unit available in standard sizes of 43,000, 50,000 and 63,000 lb/hr, described in Bulletin PG-59-4. Performance characteristics, line drawings, and photos included.—FOSTER WHEELER CORPORATION.

POWER TRANSMISSION MATERIAL HANDLING

600—Mechanical Shaft Seals — — Chempro mechanical external seal described in Bulletin CP-551. First seal designed for complete interchangeability with packing. No mounting clamps, machinery stuffing box faces or drilling holes. Install in 30 min. Adjust after installation. — CHEMICAL & POWER PRODUCTS, INC.

605—Cranes & Hoists — Production moves faster, more efficiently and you increase usable storage space with Job-Mated cranes and hoists. Bulletin gives the right combination

of capacity, clearance, speed, controls and components to handle each job best. — SHEPARD NILES CRANE AND HOIST CORP.

606—Retaining Ring Kits — 400 Truarc cadmium plated rings — 84 sizes in one economy kit. Sizes from ¼ to 2½ in. in three most used series of internal, external and universal crescent ring designs. — $34.50 per kit. — DIXIE BEARINGS, INC.

608—Side-Loading Trucks — One unit can easily load, stack and transport long, bulky selective loads. Traveloader maneuvers in aisles only 6½ ft wide; electric and gas powered units; low maintenance features. — BAKER INDUSTRIAL TRUCKS.

614—Vertical Transportation — Catalog A-382 describes and illustrates details of passenger and freight elevators and escalators for use in all types of industrial plants. — OTIS ELEVATOR CO.

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616—Gas Fork Trucks — Extremely manueverable, easy-to-operate trucks described in catalog. Standard full capacity lifts up to 144" — higher lifts available. Pneumatic - tire models for rugged indoor - outdoor work. — BAKER INDUSTRIAL TRUCKS DIV.

618—Casters & Wheels — Featuring "Lockweld" steel casters without a king-pin, Cat. C-57 describes full line of industrial wheels manufactured and distributed from Rome, Ga. plant. — THE FAIRBANKS CO.

625—Job-Mated Hoists — Capacities from ¼ to 30 tons; motor-driven or push-type trolleys; single or multiple speed controls; pushbutton, pendant rope, or lever controllers; floor or cab operation; vapor-proof or explosion-proof construction. — SHEPARD NILES CRANE AND HOIST CORP.

641—Belt Conveyors — Cat. ID-591, 88 pages, shows principal belt conveyor products, including heavy duty and standard roller bearing and precision ball bearing idlers. Engineering data section contains simplified information for proper selection. — CONTINENTAL CONVEYOR & EQUIPMENT CO.

644—Elevator Maintenance — How Otis contract maintenance service keeps equipment operating like new outlined in 24 page catalog. Preventive maintenance corrects one fault before one fault can cause another. — OTIS ELEVATOR COMPANY.

WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

700—Peak Load Problems? — Keep your air conditioning and refrigeration systems operating at maximum efficiency during peak load months. Catalog tells how Anco treatment removes rust and scale and kills slime and algae in equipment. — ANDERSON CHEMICAL COMPANY.

702—Water Conditioning — Bulletin 611C, 20 pages, describes manual and automatic softeners, zeolites and ion exchange resins, mixed-bed and multi-column deionizers, dealkalizers, ion exchange systems, filters and purifiers, and water treating chemicals. — ELGIN SOFTENER CORPORATION.

703—Industrial Air Conditioner — Bulletin 122 describes methods to obtain control of air properties with accuracy of 1% in R. H. and 1 F in temperature (up to 140 F dew point) with compact high capacity apparatus. Entirely independent of the use of moisture-sensitive instruments.—NIAGARA BLOWER COMPANY.

704—Water Conditioning — Brochure describes company's engineering services — zeolite water softeners, filters and purifiers, aera-

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Bulletins (Cont.)

tors and degasitors and process and boiler water conditioning. Rebuilding and Modernizing Service. — SOUTHERN WATER CONDITIONING, INC.

705—Test Your Tower — Bulletin offers simple, proven method of determining how closely actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. — THE MARLEY COMPANY, INC.

706—Centrifugal Blowers & Exhausters — Catalog ACB-104 covers units providing uniform air pressure up to 10 psi, or vacuum up to 12-in. of mercury. Volumes to 20,000 cfm. Line provides clean, dry air or gas at constant pressure for many processes. — Air Appliance Div., HOFFMAN INDUSTRIES.

709—Purer Process Water — Data tells how Ferri-Floc (ferric sulfate) can help with coagulation and softening, removal of iron and manganese and other water purification problems. — TENNESSEE CORPORATION.

711—Refrigeration Condensers—Bulletin RC-2 shows how Vogt condensers step up rate of heat transfer and step down head pressures. Closed type for clean water; film type where water is hard and forms scale. Units save power and refrigeration cost. — HENRY VOGT MACHINE COMPANY.

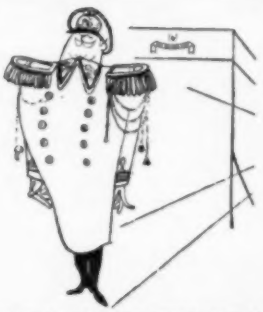
712—Ion Exchange — Bulletins discuss Two-Bed De-Ionizers and Mixed-Bed De-Ionizers, with photos to illustrate plant applications and diagrams to show operation. — ILLINOIS WATER TREATMENT COMPANY.

713—Electric Precipitators—26 page Bulletin 104 shows how units meet five engineering requirements —Positive control of gas flow; high, uniform electrode emission; effective continuous cycle rapping; and safe, trouble-free high voltage equipment. Gives 9 steps to successful installation. — BUELL ENGINEERING COMPANY, INC.

714—ALGAE IN COOLING TOWERS — Special report is two-year study of algae in cooling towers in all parts of the country. Valuable reference piece for your water treatment library. — DEARBORN CHEMICAL COMPANY.

719—No Frost Refrigeration — Bulletin 105 describes with diagrams and photographs method used for food freezing, chilling and warehouse refrigeration on largest scale without frost or ice formation, insuring full capacity and uniform temperature.—NIAGARA BLOWER CO.

720—Power Roof Ventilator—4 page Bulletin 550 illustrates and describes Centrilator, the centrifugal



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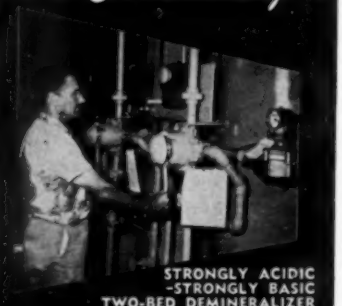

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power roof ventilator with the exclusive "jet siphon." Includes capacity and dimension tables. — CLARAGE FAN CO.

724—Chemicals & Services — Water treatment chemicals and engineering services for The Industrial South-Southwest highlighted in 12 page Bulletin 5000-A. Specific products and their functions detailed. — DEARBORN CHEMICAL COMPANY.

733—Air Handlers — Technical bulletins describe air handling units 665-47,000 cfm capacity. — ACME INDUSTRIES, INC.

736—Coagulant Aids — Product reports and case studies available on seven new Claracel formulations — effective flocculating agents and coagulant aids for use in potable water supply systems.—THE NORTH AMERICAN MOGUL PRODUCTS COMPANY.

737—Water Treating Plan—Separate bulletins combine in folder to form "A Complete Water Treating Plan" for boiler feedwater and cooling water treatment. Leaflets cover various aspects of treatment and equipment. — DEADY CHEMICAL COMPANY.

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743—Compressor & Engine Filters — Bulletin 310-6, 4 pages, contains information on air filters for compressors and engines, designed to eliminate costs and delays of forced shut-downs caused by dust concentration. — COPPUS ENGINEERING CORP.

751—Chemical Service — Water conditioning products, equipment and services highlighted in literature — boiler feedwater treatment, cooling water treatment, corrosion inhibitors, fuel oil additives, coagulants, cation resin cleaners. — Chemical Service Dept., THE PERMUTIT COMPANY.

752—Automatic Water Control — 4 page bulletin describes Chemtrol control for treatment of cooling tower water. Adaptable to any size unit, in any location, and to any type water, it controls pH, prevents scale, controls corrosion and eliminates algae — all simultaneously, completely automatically and economically. — WATER SERVICES INC.

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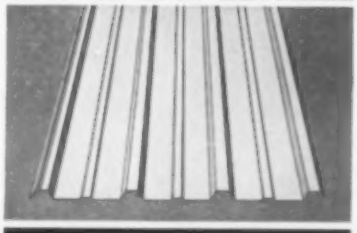

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757—Boiler Water Treatment — Data sheets P-101 through P-107 summarize products and their application. — FULBRIGHT LABORATORIES, INC.

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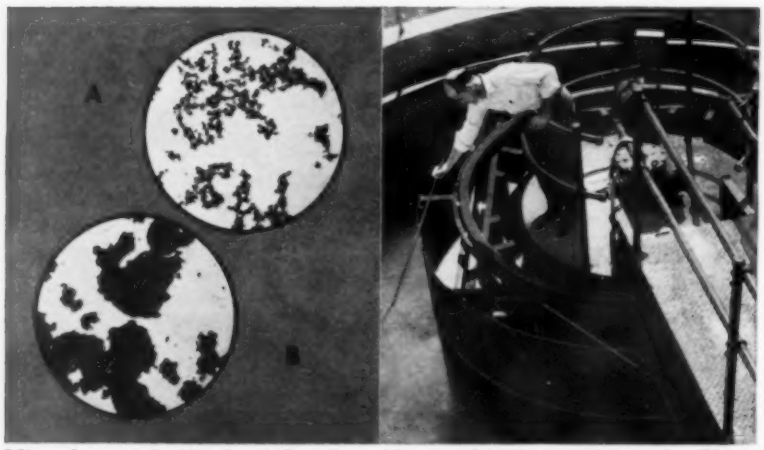

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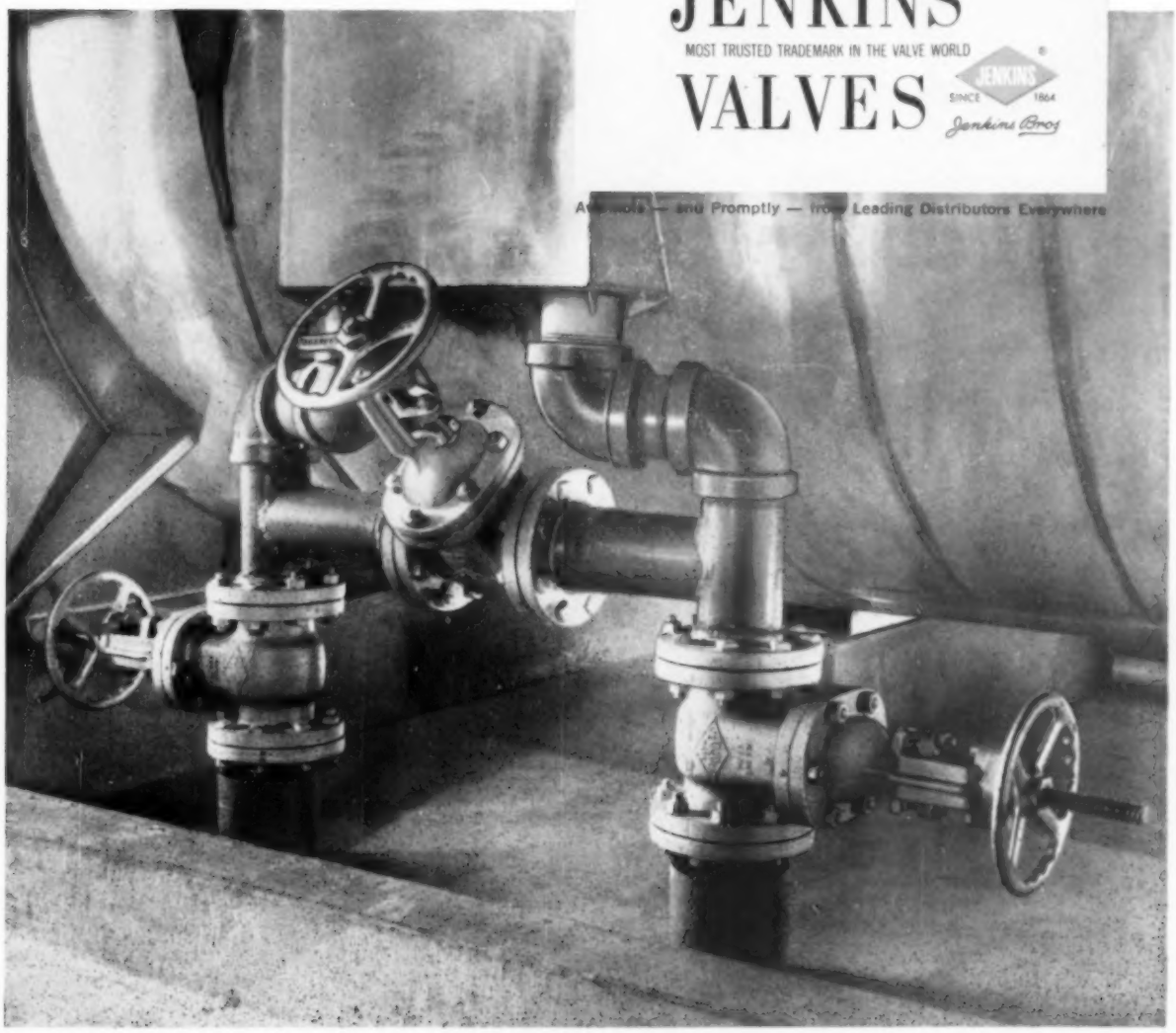

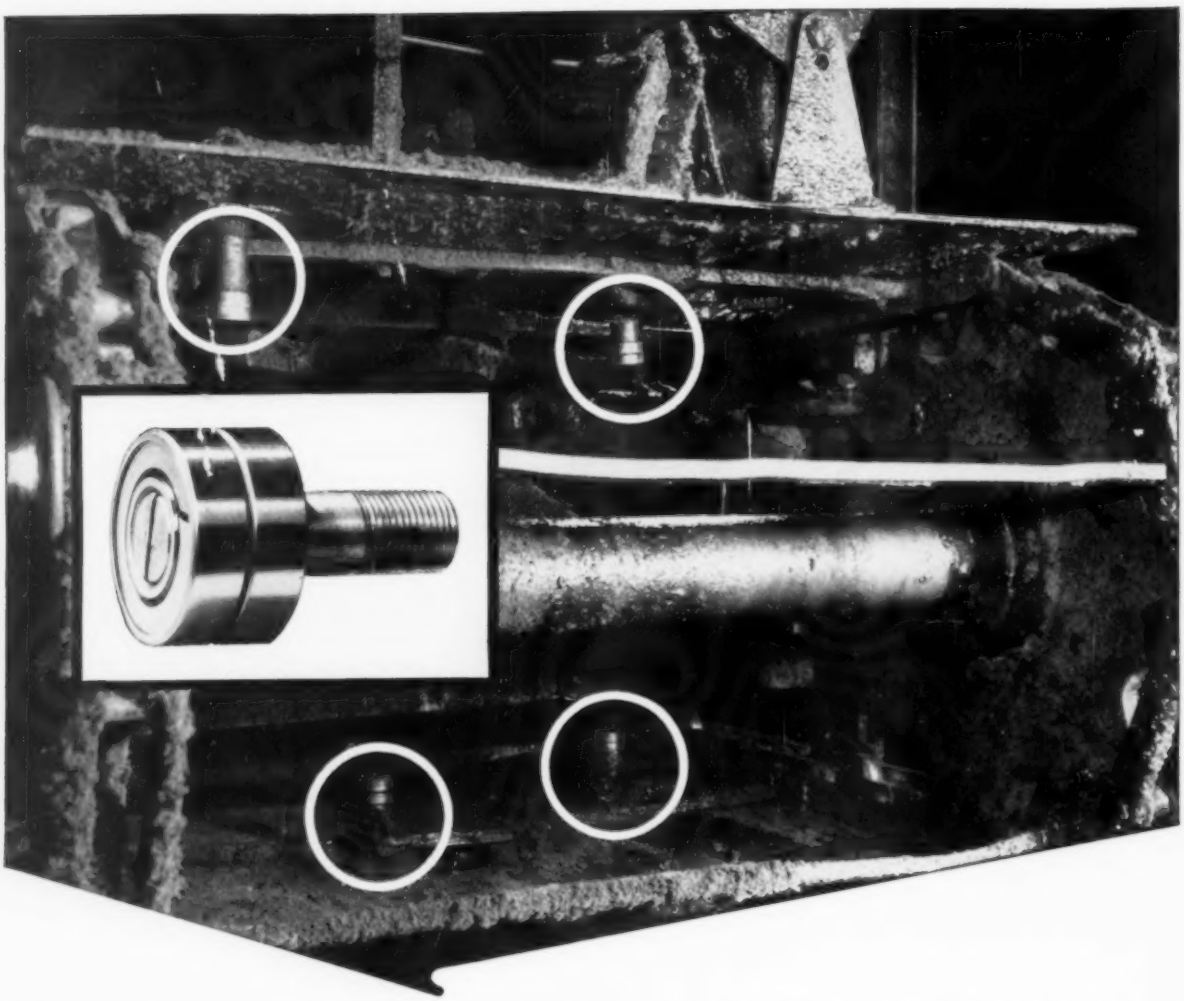

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